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Choose the single best answer

1. The least likely trauma to cause multiple injuries is:

- A. Fall from a height.
- B. Machinery accidents.
- C. Road traffic accidents.
- D. Explosions.

B. Machinery, house and most of sports accidents cause isolated injuries. The others are likely to cause multiple injuries.

2. About triage for mass casualties, all the following statements are true, except:

- A. Is used to sort trauma victims' priority for management at the scene of accident.
- B. Is used to sort trauma victims' priority for transfer to hospital.
- C. Is used to sort trauma victims' priority for management in emergency room.
- D. Those who are likely to die, regardless of whatever care they receive, are not given first priority.
- E. Those who are likely to live, regardless of whatever care they receive, should be given first priority.

E. Those for whom immediate care might make a positive difference in outcome should have priority over choices D and E.

3. For a road-traffic-accident victim, the first priority of management is given to which of the following injuries?

- A. Open pneumothorax on the right side.
- B. Tension pneumothorax on the left side.
- C. Bleeding scalp laceration.
- D. Fracture of the shaft of right femur.
- E. Unstable fracture of the pelvis.

B. Tension pneumothorax is an extreme emergency as it causes rapidly progressive respiratory and circulatory impairment. In addition to ipsilateral lung collapse, the mediastinum shifts to the opposite side to impair its ventilation. The increasing intra-thoracic pressure also impairs venous return. Once clinically diagnosed, immediate treatment is indicated. Multiple wide-bore needles are placed in the affected pleural space in order to convert into the less serious open pneumothorax. Once circumstances allow, a chest tube is placed. Time should not be wasted in radiological diagnosis.

4. A trauma victim is hypotensive. Any of the following can be the cause, except:

- A. Extradural haematoma.
- B. Lacerations of the spleen.
- C. Pelvic fractures.
- D. Liver lacerations.
- E. Bilateral fracture of femoral shafts.

A. An extradural haematoma is enclosed within the tight confines of the skull. Only a small amount of blood can accumulate. This small amount can cause a fatal rise in intracranial pressure.

5. About diagnostic peritoneal lavage (DPL) for blunt abdominal trauma, all the following statements are true, except:

- It is a good method for diagnosing intestinal injuries.
- It is a good method for diagnosing renal injuries.
- It is a good method for diagnosing intra-peritoneal bleeding.
- There is no need for it in the shocked patients who have abdominal tenderness and rigidity.
- If abdominal ultrasound is to be also done, sonography should precede DPL.

B. Bleeding from renal injuries is usually confined to the retroperitoneal space. DPL, however, can reveal blood in case of intraperitoneal haemorrhage and can also reveal intestinal contents in case of bowel injury. The shocked patient with positive abdominal signs should be transferred to the operating theatre for laparotomy, while transfusing blood. DPL, CT and ultrasound are not needed. If ultrasound or CT is done after DPL they will inevitably detect free intraperitoneal fluid. There will be confusion about its source; abdominal injury or residual lavage fluid.

6. A 26-year old man was stabbed in the central abdomen. He presents to the emergency room with the knife blade still embedded in the abdomen. His pulse is 125/min, his blood pressure is 80/40mmHg. All the following measures are correct, except:

- Remove the knife immediately in the emergency room.
- Place IV cannulas and start administration of lactated Ringer's solution.
- Cross-match blood.
- No need for imaging studies of the abdomen.
- Urgent laparotomy.

A. The knife blade may be partially occluding the rent it induced in a vessel or a solid organ. Removal of the knife invites immediate severe haemorrhage. This step should be postponed until the patient is under anaesthesia in OR and is draped, ready for laparotomy. The described situation is that of intra-abdominal haemorrhage that requires urgent laparotomy to control. Imaging studies will add nothing to the diagnosis, and will waste very precious time.

7. **QUESTION:** A victim of a road traffic accident is brought to the emergency room with increasing dyspnoea and chest pain. He is cyanotic, his neck veins are congested, his blood pressure is 90/60mmHg, and his right chest is bulging and exhibits marked resonance. The most probable diagnosis is:

- Massive haemothorax.
- Flail chest.
- Open pneumothorax.
- Tension pneumothorax.
- Cardiac tamponade.

D. Tension pneumothorax.

8. About tension pneumothorax, one of the following statements is true:

- A. Diagnosis should be established with Plain chest X-ray.
- B. Diagnosis should be confirmed with CT scan of the chest.
- C. The condition is less serious than open pneumothorax.
- D. Immediate treatment is placement of wide-bore needles in the ipsilateral hemithorax.
- E. Definitive treatment is always surgical.

D. The diagnosis of tension pneumothorax is a clinical one. Once diagnosed or suspected, time should not be wasted doing x-rays. Immediately, wide-bore needles are placed in the pleura through the intercostals spaces. This can be done at the scene of accident. Once the circumstances allow, a chest tube is inserted. The majority do not require surgery as the valvular opening in the chest wall or in the lung will heal spontaneously.

9. By the end of an exploratory laparotomy, the surgeon finds that the viscera are bulging and it is difficult to close the abdomen. The best to be done is:

- A. Using a polygalactin mesh for closure.
- B. Using a polypropylene mesh for closure.
- C. Leaving the abdomen open and covering the viscera with sterile packs.
- D. Closing the abdomen under tension.
- E. Closing the abdomen under tension and supporting it with an abdominal binder.

A. This is a commonly encountered situation because of visceral oedema, retroperitoneal haematomas, and the added bulk of packs that may be placed to tamponade bleeding. Closure under tension is not advised anywhere in the body. The problems of abdominal closure under tension are:

- *It causes abdominal compartment syndrome. The intra-abdominal pressure rises to a level that may impair venous return to the heart, and may impair renal circulation. In addition, the diaphragm is splinted up, thus reducing the efficiency of ventilation.*
- *Closure under tension is bound to fail because of tissue ischaemia. Suture will cut through, resulting in burst abdomen.*

Polygalactin mesh closure is a safe method for bridging the defect between the edges of the musculo-aponeurotic layers. An alternative is the temporary use of sterile blood transfusion bag (Bagota bag). Polypropylene mesh is not advised as it causes intestinal adhesions and fistulas if it comes in direct contact with the bowel.

10. About Glasgow Coma Scale (GCS), all the following statements are true, except:

- A. It is a numerical measure of the level of consciousness.
- B. A rise in intra-cranial tension reduces GCS.
- C. GCS components are eye opening, best verbal response and best motor response.
- D. GCS cannot be assessed in intubated and in sedated patients.
- E. The highest GCS is 12.

E. Eye opening scale is 1 to 4. Best verbal response scale is 1 to 5. Best motor response scale is 1 to 6. Thus the lowest scale is 3; while the highest scale (fully conscious) is 15.

11. A trauma victim opens his eyes in response to commands, is disoriented when asked about his profession, and localizes painful stimuli. His Glasgow Coma Scale is:

- A. 6.
- B. 8.
- C. 9.
- D. 10.
- E. 12.

E. Eye opening score is 3. Best verbal response is 4. Best motor response is 5. Total GCS is 12

12. In a bleeding patient, the most important parameter to assess successful fluid replacement is:

- A. Pulse rate.
- B. Blood pressure.
- C. Urine output.
- D. Skin elasticity.
- E. Level of consciousness.

C. The best parameter of tissue hydration is urine output. The normal value in adults is 0.5-1ml/kg/hour. In children it is double this value, i.e., 1-2ml/kg/hour.

13. About compartment syndrome of the leg, all the following statements are true, except:

- A. It may result from contusions and haematomas of leg muscles.
- B. It may result from compound fractures of the tibia.
- C. The leg feels tense.
- D. It may cause arterial insufficiency.
- E. The treatment is fasciotomy.

B. Muscles of the leg are enclosed in a tight sleeve that is formed of the deep fascia. Fascial septa divide these muscles into three compartments; anterior, posterior and lateral. A rise in pressure in one or more of these compartments compresses veins, arteries and nerves. Muscle oedema due to contusions and muscle haematomas can produce this effect. A compound fracture of the tibia means that the deep fascia and the skin are opened. This provides a vent for any possible rise of compartment pressure. Treatment of acute compartment syndrome is urgent fasciotomy.

14. Internal fixation is indicated in one only of the following conditions:

- A. Fracture of the clavicle.
- B. All fractures in children.
- C. Associated repair of an arterial injury.
- D. Compound fractures.
- E. Fracture of the skull base.

C. Rigid fixation of a fracture is needed for healing of an arterial repair, otherwise it will be disrupted or contused and thrombosed. Internal fixation of compound fractures is contraindicated because of the risk of inducing osteomyelitis. If rigid immobilization is required, external metal fixation is the solution.

15. A workman fell on a bar that hit the perineum. On presentation in the emergency room he is found to have a drop of blood at the tip of the urethra. There is also a perineal haematoma. Management includes all the following, except:

- A. Advise the patient not to pass urine.
- B. Immediate catheterization.
- C. Antibiotic administration.
- D. Urgent ascending urethrography.
- E. Suprapubic cystostomy if a urethral tear is diagnosed.

B. This patient is suspected to have injury of the bulbous urethra. If the patient voids, urine will spread in the subcutaneous tissues deep to the membranous part of the superficial fascia. Urine can extend up in the same plane to the anterior abdominal wall and down to the upper thighs only because this membranous layer gets attached to the deep fascia of the thigh. To guard against infection, antibiotic prophylaxis is given. If urgent ascending urethrography shows no urethral tear (no extravasation), the patient is allowed to void. If it shows extravasation, urethral catheterization is contraindicated as it may compound the injury and the catheter may not be possible to direct into the bladder. A suprapubic cystostomy is a safer alternative in the acute phase.

16. About early management of fall-from-height victims, all the following statements are true, except:

- A. A cervical collar should be postponed until cervical spine fracture is proved.
- B. Arrest of external bleeding by compression takes priority over splinting of fractures.
- C. Cervical spine X-ray is a routine part of early management.
- D. Chest X-ray is a routine part of early management.
- E. Pelvis X-ray is a routine part of early management.

A. This is a severe trauma that usually causes multiple injuries. Cervical spine fracture should be assumed and a collar is placed, until proved otherwise by X-rays.

17. Regarding traumatic diaphragmatic rupture, all the following statements are true, except:

- A. It mainly affects the left side.
- B. Plain Chest X-ray can be diagnostic.
- C. It is very easy to diagnose.
- D. It is likely to be associated with abdominal and thoracic injuries.
- E. The only treatment is surgical repair.

C. Diaphragmatic injuries are commonly missed and tend to present at a later date with a diaphragmatic hernia. If hollow viscera (stomach and intestine) migrate into the thoracic cavity, a chest X-ray is diagnostic. To improve its diagnosis, diaphragmatic injuries should always be kept in mind.

Choose the single best answer

1. The most important factor that affects wound healing is:
- Wound closure within 2 hours of injury.
 - Proper choice of suture material.
 - Daily change of wound dressing.
 - Adequate vascularity of the edges.
 - Adequate nerve supply of the edges.

D. The most important factor that affects wound healing is vascularity of its edges. If well-vascularised edges are brought together without tension and without infection, proper healing will take place. This principle applies to the skin as well as soft tissues, bone fractures and to intestinal anastomoses. The choice of suture material makes a far less effect on the process of healing.

2. The following statements are all correct, except:
- Hypoproteinaemia impairs wound healing.
 - Immobilization of the wounded part helps wound healing.
 - Corticosteroid intake impairs wound healing.
 - The intake of cancer chemotherapy delays wound healing.
 - Irradiation of a wound improves healing.

E. Irradiation induces end arteritis obliterans. The resultant ischaemia impairs wound healing. Hypoproteinaemia, particularly hypoalbuminaemia also impairs wound healing. It is frequently seen in patients with liver cirrhosis, nephrotic syndrome and sepsis. Immobilization of the wounded part prevents any shearing movement between the edges and allows them to stick together until more robust healing takes place. Cancer chemotherapy inhibits mitosis, mainly of cancer cells, but also to a lesser extent that of healing tissues. Corticosteroids also delay wound healing, a fact that should be put in consideration when operating on patients receiving them as those with bronchial asthma, rheumatoid arthritis and ITP (immunogenic thrombocytopenic purpura).

3. About wound management, one statement only of the following is correct:
- Debridement is the removal of dead tissues and foreign bodies.
 - Debridement is necessary for clean incised wounds to get good drainage.
 - Nerve repair in lacerated crushed wounds is of first priority.
 - In fresh clean-cut wounds mark the cut tendons for delayed treatment.
 - Deep fascia closure after muscle debridement is indicated.

A. Debridement entails removal of foreign material and unhealthy tissues (ischaemic or dead) from a lacerated or crushed wound. Surgical debridement requires liberal washing of the wound with saline, removal of foreign particles, and excision of crushed and dead tissues. This procedure leaves healthy wound edges that are ready for healing. Chemical debridement is a slower process that entails the application of ointments that contain proteolytic enzymes.

A clean incised wound does not contain foreign bodies (as the name clean indicates) and the wound edges are already well-vascularised.

In a clean incised wound, cut tendons and nerves are primarily repaired (in the same session as wound repair). In a lacerated wound, however, the viability of their edges is frequently difficult to assess, and if judged so, their repair can be postponed to a later date.

Muscle injury is commonly followed with oedema and haematomas. The deep fascia is a tough non-compliant layer, and therefore, its closure over injured muscle is likely to raise tissue pressure in such a tight compartment. This is called "compartment syndrome" and is likely to compress and close blood vessels.

4. For hernia repair the best suture material to be used is:

- A. Polypropylene as it is non-absorbable.
- B. Plain catgut as it is resistant to infection.
- C. Silk as it is monofilament.
- D. Chromic catgut because it is easily absorbable.
- E. Polygalactin as it is non-absorbable.

A. A hernia must be repaired with non-absorbable material so as to resist stresses for life. Polypropylene, which is monofilament, is favoured than silk as the latter is braided and is, therefore, more likely to carry bacteria in its interstices. Plain catgut, chromic catgut, and polygalactin are absorbable sutures. Their use for hernia repair is accompanied by a high incidence of recurrence. Furthermore, catgut is highly susceptible to infection.

5. Factors that make lacerated wounds more liable to infection include the following, except:

- A. Presence of foreign bodies.
- B. Ischaemic or dead tissues.
- C. Suture of the wound under tension.
- D. Leaving the wound open after debridement.
- E. The use of internal fixation for accompanying fractures.

D. Whenever wound infection is a high possibility, leaving it open allows drainage of the exudate, reduces tissue tension, and consequently reduces infection. This policy is suitable when there is heavy contamination, severe tissue crushing, and when tissues of doubtful viability are not excised.

6. Delayed primary closure of the skin means:

- A. Closure of the skin by subcuticular sutures.
- B. Skin closure on the 12th day after surgery.
- C. Skin closure when pus stops to drain from the wound.
- D. Skin closure on the 5th day.
- E. Skin closure of a wound 12 hours after emergency wound surgery.

D. Delayed primary closure is a policy that is useful in the treatment of contaminated wounds. With bacteria in the wound, primary skin closure entraps exudates and raises the possibility of

infection. Postponing skin closure to the 5th day will reduce this possibility. The speed of healing and the appearance of the scar are usually as good as those of primary repair of clean incised wounds.

7. Postoperative wound infection can produce the following, except:

- A. Stitch sinus.
- B. Reactionary haemorrhage.
- C. Septicaemia.
- D. Incisional hernia.
- E. Burst abdomen.

B. Reactionary haemorrhage occurs during the first 24 hours after injury or surgery. It is not related to infection but to rise of blood pressure in the presence of inadequate control of bleeding vessels. Stitch sinus is caused by infection of a stitch. It is eliminated by removal of this stitch. Septicaemia is a remote, yet possible, sequel of extensive infection of large wounds. Infection of an abdominal incision is the most frequent cause of both incisional hernia and of burst abdomen. Both represent grades of wound failure.

8. Incised wounds

- A. Heal faster than lacerated wounds.
- B. Are more likely to injure deeper structures than missile wounds.
- C. The accompanying shock waves produce extensive local damage.
- D. Treatment is by haemostasis and leaving the wound open to drain.
- E. The wound is sutured by plain catgut.

A. In an incised wound the edges are well vascularised. Their main problem is bleeding rather than impaired healing. Their usual treatment is haemostasis and primary repair. Missiles produce the most extensive injuries among the causes of trauma. Plain catgut is no more in use in modern surgical practice. This is because of its marked tissue reaction and the high susceptibility to infection.

9. The following statements are correct, except:

- A. The extent of tissue damage by a missile depends upon its weight.
- B. The extent of tissue damage by a missile is proportionate to its velocity.
- C. Stab wounds are inflicted by knives and may injure viscera.
- D. Stab wounds usually fracture bones and thus add to tissue damage.
- E. Lacerations are usually caused by blunt objects trauma.

D. Missile injuries cause more extensive injuries than stab wounds. Injuries occur both within the missile track and away from it. This is particularly marked with high-velocity missiles (from rifles) than with low-velocity missiles (from pistols). The main factor that determines the extent of damage by a missile is, therefore, its velocity. The next factor is the missile weight; the heavier, the more is the damage. Stabs do not fracture bones, but missiles do and the bone splinters induce further damage.

10. For contaminated incised wounds of 18 hours duration one choice is correct:
- A. Wound irrigation and delayed primary closure is preferred.
 - B. Urgent repair of cut tendons provides the best results.
 - C. Immediate repair of cut nerves by nerve graft is advised.
 - D. Extensive debridement of muscles is necessary.
 - E. Anti-gas gangrene serum is indicated.

A. In the presence of contamination delayed primary closure of an incised wound reduces the possibility of infection.

In the presence of contamination, primary repair of nerves and tendons exposes them to the risk of failure because of possible infection.

Incised muscles are still well-vascularised; and hence need no debridement. For the same reason gas gangrene is not a threat.

11. The following are correct about abrasions, except:

- A. They are painful wounds.
- B. They heal by scar tissue formation.
- C. They are caused by friction with rough surfaces.
- D. Tendons and vessels are not exposed.
- E. Treatment is by antiseptics and non-adherent dressings.

B. Abrasions involve the epithelial cover of the skin. If cleaned and protected, they heal with epithelialisation rather than granulation tissue formation, hence no fibrosis. As the underlying nerves are exposed, abrasions are particularly painful.

12. About healing by secondary intention, all the following statements are true, except:

- A. Wound infection leads to healing by secondary intention.
- B. It is a slow process.
- C. It ultimately produces a neat scar.
- D. Wound contraction is involved in this type of healing.
- E. Granulation tissue fills the gap before epithelium covers the raw area.

C. In healing by secondary intention wound contraction and granulation tissue formation play major roles. The wound edges are separated, commonly because of drained infection. Granulation tissue has to fill the gap before epithelium, from the edges, creeps to cover the raw area. It is a slower process than primary intention healing and usually results in an ugly scar.

13. About scars, all the following are true, except:

- A. Contracture impairs joint movement.
- B. Squamous cell carcinoma may arise on top of a scar.
- C. A scar regains the original tissue tensile strength in 6 months.
- D. A superficial burn leaves no scar.
- E. A scar is devoid of hairs.

C. Granulation tissue is converted to fibrous tissue. Fibrous tissue contracts. If the scar contains a big amount of fibrous tissue, commonly as a result of healing by secondary intention, this leads to marked scar contracture. In addition to its unsatisfactory appearance another problem arises when this scar is crossing a joint because it impairs joint mobility, e.g., a contracted scar that crosses vertically in front of the elbow joint limits its full extension.

A scar is known to never regain the original tensile strength of the tissue before its injury. A superficial burn damages part of the epithelium only. The remaining epithelial cells creep to cover the denuded areas, i.e., it heals purely by epithelialisation. Granulation tissue is not involved in this process, hence no fibrous tissue and no scars at all.

A scar is devoid of all skin appendages, namely, hairs, sweat glands and sebaceous glands.

14. The injuries that are induced by high velocity missiles are attributed to all the following, except:

- Passage of the missile in its track through the tissues.
- Sonic waves.
- Cavitation effect.
- Neatly slicing the tissues.
- Splintering bones.

D. A missile causes tissue injury by virtue of the following mechanisms:

- Direct injury by passage through its track.
- Sonic waves that precede the missile.
- Cavitation effect around its track.
- Shattering bones. Bone splinters scatter to induce further damage.

Missiles do not slice neatly through the tissues. This is a character of stabs. Missiles badly disrupt the tissues.

Two facts should be remembered about missile injuries:

- The higher the velocity, the more is the damage.
- Injuries can occur away from the missile tract.

15. A keloid

- Is more frequently seen in black people than Caucasians.
- Never follows a puncture wound.
- Stops growing after 6 months.
- Never develops in a sternotomy incision.
- Ideal treatment is wide resection with a safety margin.

A. Where wound dehiscence represents failure of healing, a keloid represents another error in this process, namely, excessive healing. Fibrous tissue growth exceeds the need and spills over the edges of the wound. The scar is wide and extends beyond the wound, and is elevated. A keloid continues to grow more than 6 month after the injury (or operation). A keloid is known to follow big or small wounds, even a puncture, e.g., ear piercing. The condition is more prevalent in dark races. Its commonest site is the pre-sternal skin. A median sternotomy incision, that is commonly used to operate on the heart, is very likely to develop a keloid. There is no need for wide resection as it is not a malignant neoplasm. Localised excision or shaving with local steroid injection and prolonged compression yield the best results.

Postoperative irradiation has been attempted. Still none of these methods is perfect and recurrence rate is high.

Choose the single best answer

1. About shock, one statement only is true:

- A. In hypovolaemic shock, perfusion of different organs is simultaneously affected.
- B. There is metabolic alkalosis.
- C. Cardiac output is reduced in cardiogenic shock.
- D. Severe arrhythmias cause hypovolaemic shock.
- E. Increased peripheral resistance is the cause of neurogenic shock.

C. In shock states there is marked discrimination between organs for their share of blood supply. Skin is the first organ to suffer ischaemia. If shock persists, muscles become ischaemic. Still, if shock persists, viscera are affected. The last organs to be affected are the noble organs; heart and brain.

Hypoxia drives the tissues into anaerobic metabolism. This results in production of lactic acid, which causes metabolic acidosis.

Cardiogenic shock is characterized by reduction of stroke volume, and consequently cardiac output. Causes of cardiogenic shock are cardiac tamponade, massive myocardial ischaemia and severe arrhythmias.

Neurogenic shock is caused by extensive peripheral vasodilatation, i.e., reduced peripheral resistance.

2. The following factors are all involved in the pathogenesis of septic shock and multiple organ failure, except:

- A. Release of cytokines by macrophages.
- B. Damage of vascular endothelium.
- C. Defective oxygen delivery to the cells.
- D. Marked anaemia.
- E. Dysfunction of intestinal mucosa allows more bacteria to enter the blood stream.

D. Anaemia is not involved in the pathogenesis, but if severe, it aggravates tissue ischaemia.

3. About consequences of shock, all the following statements are true, except:

- A. Hypoxia reduces energy production.
- B. Sodium/potassium pump is impaired.
- C. Excess sodium leaks out of cells.
- D. Endothelial cells leak protein-rich fluid from the capillaries.
- E. Gastro-duodenal mucosal ischaemia causes acute stress ulcerations.

C. Cellular hypoxia drives the cells into anaerobic metabolism, which produces small amount of energy and excess lactic acid. Energy is needed to maintain the integrity of sodium/potassium pump. Shock, therefore, leads to failure of this pump, and, consequently, sodium accumulates inside the cells. Cells become swollen because sodium is always accompanied by water. The swollen cells do not function properly (sick cell syndrome). If not treated, shock ultimately results in cellular rupture (cell death).

Impairment of capillary endothelial cells is particularly important in the pathogenesis of shock consequences. Capillaries leak more fluid, which is rich in protein. The result is aggravation of hypovolaemia. The change in extracellular fluid amount and composition has an important bearing on the organs, particularly the lungs.

4. About the compensatory mechanisms of hypovolaemia, all the following are true, except:

- A. The earliest mechanism is the secretion of aldosterone.
- B. The sympatho-adrenal response is mediated by the baroreceptors.
- C. The sympatho-adrenal response results in tachycardia.
- D. The sympatho-adrenal response increases the stroke volume.
- E. Aldosterone reduces urine output.

A. The sympatho-adrenal response is the earliest compensatory mechanism. It is mediated by the baroreceptors that are present in the carotid sinus and the aortic arch. Catecholamines have a chronotropic effect (accelerates heart rate) and an inotropic effect (increases force of myocardial contractility).

Aldosterone conserves blood volume by causing salt and water retention by the kidneys.

5. About management of shock, all the following statements are true, except:

- A. Oxygen administration is indicated for all shocked patients.
- B. Immediate volume replacement in haemorrhagic shock is best done by lactated Ringer's solution.
- C. Central venous pressure reflects preload.
- D. Dopamine is used when shock fails to improve despite volume replacement and oxygenation.
- E. Dopamine reduces renal blood flow.

E. For all shocked patients oxygen at high concentration is initially administered through a face mask. Later adjustment of rate and concentration depends on arterial gas measurements. Evidence of respiratory failure is an indication for endotracheal intubation and mechanical ventilation.

Lactated Ringer's solution is readily available, while blood needs time for cross-matching. Lactated Ringer's solution has the closest electrolyte composition to plasma. Its infusion should be started immediately. It is run at a rapid rate so that in a period of 45 minutes 1-2L is given. The procedure is also a therapeutic trial to determine the pre-existing amount of blood loss or the presence of continuing blood loss.

In addition to its inotropic effect, dopamine increases renal blood flow and helps in reducing the incidence of renal failure.

6. Shock with elevated CVP is:

- A. Hypovolaemic shock.
- B. Septic shock.
- C. Cardiogenic shock.
- D. Neurogenic shock.

E. Anaphylactic shock.

C. Pump failure (cardiogenic shock) causes stagnation of blood in the venous system.

7. Shock with bradycardia is:

- A. Hypovolaemic shock.
- B. Septic shock.
- C. Cardiogenic shock.
- D. Neurogenic shock.
- E. Addisonian crisis.

D. Bradycardia is due to sympathetic paralysis that is caused by injuries of the cervical part of the spinal cord.

8. In septic shock, one statement only is true:

- A. The overall mortality rate is about 5%.
- B. Gram-negative organisms are involved exclusively.
- C. Septic shock is a maldistribution shock.
- D. In its hypodynamic phase the skin is flushed.
- E. In its hyperdynamic phase the patient has fever.

C. The overall mortality rate exceeds 25%, and is even higher in the elderly. Gram-negative bacilli are the commonest cause but Gram-positive organisms and fungi (candida) may also be responsible. Two or more organisms are found in many cases.

Septic shock is initially caused by maldistribution of cardiac output. Under the effect of cytokines vasodilatation of the arteries occurs and arterio-venous shunts are opened. The results are:

- Reduced peripheral resistance. Nitric acid causes more reduction in the peripheral resistance.
- Capillaries are bypassed and blood is shunted, in the oxygenated form, from the arteriolar to the venular side.

The hypodynamic phase of septic shock is clinically similar to hypovolaemic shock; the skin is cold and sweating.

9. A shocked 70-year-old man had urgent laparotomy for neglected duodenal ulcer perforation. At the end of the operation, excessive undue bleeding occurs from the wound edges and from the cannula site. The most probable cause is:

- A. Consumption of coagulation factors.
- B. Dilution of coagulation factors.
- C. Hypoprothrombinaemia that is caused by liver failure.
- D. Haemophilia.
- E. Hypercarbia.

A. Disseminated intravascular coagulation (DIC) is a complication of shock, particularly the septic type. It depletes coagulation factors and induces bleeding tendency in the rest of the body (consumption coagulopathy).

10. Two hours after surgery for traumatic rupture of spleen and liver lacerations, arterial blood gas analysis on room air came as follows:

- pH 7.4
- Bicarbonate 16mmol/L
- PO₂ 99mmHg
- PCO₂ 30mmHg

The diagnosis is:

- A. Compensated metabolic acidosis.
- B. Compensated metabolic alkalosis.
- C. Respiratory acidosis.
- D. Respiratory alkalosis.
- E. Normal findings.

A. Metabolic acidosis is commonly seen in cases of shock. Though the pH is normal, a low bicarbonate level indicates metabolic acidosis. The pH is corrected by hyperventilation to wash out CO₂, as shown by low PCO₂.

11. All the following are features of ARDS, except:

- A. Increased lung compliance.
- B. Surfactant deficiency.
- C. Hypoxia.
- D. Pulmonary infiltrates on chest X-ray.
- E. Dyspnea and tachypnea.

A. Adult respiratory distress syndrome (ARDS) is one example of the multiple organ failure syndrome, which occurs with shock. Pathogenesis mainly involves deficiency of surfactant secretion by alveolar cells. The result is that the lungs become less compliant (more rigid) and are unable to adequately increase their volume and to recoil with respiratory effort. If untreated, respiratory distress ends in respiratory failure.

12. The following statements about ARDS are all true, except:

- A. Major sepsis, burns and severe pancreatitis are important causes.
- B. Dyspnea is the main symptom.
- C. There is impairment of ventilation and perfusion but not diffusion.
- D. Clinical manifestations precede the appearance of radiological signs.
- E. Surfactant is deficient.

C. Shock, particularly the septic type, major burns and severe pancreatitis, can all trigger the release of cytokines that lead to systemic inflammatory response syndrome (SIRS) then to multiple organ failure (MOF).
Dyspnea, tachypnea and hypoxia are present with the onset of ARDS. The finding of pulmonary infiltrates on plain chest X-ray takes about two days to appear.
All three elements of respiration, namely, ventilation perfusion and diffusion, are involved.
Impaired ventilation

- Stiff lungs (surfactant deficiency).
- Alveolar oedema

Impaired perfusion

- Shock.
- Shunts.

Impaired diffusion

- Thickened alveolocapillary membrane because of interstitial oedema.

13. About renal failure that is caused by shock, all the following statements are true, except:

- Renal ischaemia causes acute tubular necrosis.
- Healthy kidneys can tolerate ischaemia for 30-90 minutes.
- Renal failure is irreversible.
- Urine output that is less than 400ml/day, in an adult, is diagnostic of renal failure.
- Dopamine has a protective effect against renal failure.

C. Healthy kidneys can tolerate ischaemia for a period that ranges from 30-90 minutes. This is called "warm ischaemia time". This fact is also important in cases of renal transplantation where cooling of the donated kidney is used in order to prolong its tolerance to ischaemia. In cases of shock, renal failure is caused by acute tubular necrosis. If shock is timely corrected and normal renal perfusion is resumed, tubular cells can regenerate and the condition is reversible.

A low urine output <400ml/day is diagnostic of renal failure though in some cases renal failure is of the high-output type. The important thing is to monitor BUN, creatinine and potassium. Dopamine, even in small doses, can increase renal blood flow and thus reduce the incidence of failure.

14. About cardiogenic shock, all the following statements are true, except:

- May be caused by massive myocardial infarction.
- May be caused by ventricular tachycardia.
- The neck veins are collapsed.
- The blood pressure is low.
- Traumatic cardiac tamponade is managed initially by pericardiocentesis.

C. Cardiogenic shock is caused by inability of the heart to pump an adequate stroke volume. The commonest cause is acute myocardial infarction. Severe arrhythmias as ventricular tachycardia and ventricular fibrillation can also cause it.

This is the only type of shock that is characterized by elevated CVP and congested neck veins. In a shocked trauma victim with congested neck veins, cardiac tamponade and tension pneumothorax should be considered. Both are extreme emergencies. The initial treatment of cardiac tamponade is to insert a needle in the pericardial cavity to aspirate blood. Usually this victim will later require some definitive surgery to control bleeding and to provide adequate drainage of the pericardial sac.

15. Disseminated intravascular coagulation is characterized by all the following, except:
- A. Low platelet count.
 - B. Low fibrinogen.
 - C. Prolonged PT & APTT.
 - D. Low fibrin-degradation product (FDP).
 - E. Skin ecchymoses.

D. Cytokines excite wide-spread thrombosis inside the small vessels. The result is consumption of the coagulation factors and a bleeding tendency. Bleeding starts at incision and cannula sites then manifests as skin ecchymoses.

Consumption causes reduction in platelet count, prothrombin and other coagulation factors. PT and APTT are prolonged.

Fibrin degradation products level is elevated. These are fragments that are produced when fibrin in the thrombi is broken down by the enzyme plasmin. One of the degradation products is called D-dimer. Measuring D-dimer level is also used in the diagnosis of DVT and pulmonary embolism.

Choose the single best answer

1. About basal daily requirements, all the following are true, except
- A. 30kcal/kg/day.
 - B. 0.7g protein/kg/day.
 - C. 1g nitrogen/kg/day.
 - D. 1mmol sodium/kg/day.
 - E. 1mmol potassium/kg/day.

C. 6.25g protein = 1g nitrogen. The daily requirements are 0.7g protein/kg/day. This is approximately 0.1g nitrogen/kg/day.

2. For optimal protein utilization the ratio of calories from carbohydrates and fats / nitrogen should be:

- A. 500kcal/ 1g Nitrogen.
- B. 200kcal/ 1g Nitrogen.
- C. 50kcal/ 1g Nitrogen.
- D. 20kcal/ 1g Nitrogen.
- E. 1kcal/ 1g Nitrogen.

B. If the ratio is less than 200kcal/ 1g Nitrogen, the body will catabolise proteins for the production of energy rather than for anabolism; a process that is known as gluconeogenesis.

3. In a surgical patient, malnutrition causes all the following complications, except

- A. Incisional hernia.
- B. Disruption of intestinal anastomosis.
- C. Raised incidence of infections.
- D. Reduced tolerance to cancer chemotherapy.
- E. Thrombocytopenia.

E. Platelet production and sequestration are not related to the nutritional status.

4. The parameters that indicate malnutrition include all the following, except

- A. Recent unintentional loss of 10% or more of body weight.
- B. Mid-arm muscle circumference is less than 80% of value in comparable population.
- C. Serum albumin that is less than 45 g/L.
- D. Body mass index (BMI) less than 18kg/m^2 .
- E. Impairment of delayed hypersensitivity reaction.

C. Serum albumin that is less than 35 g/L indicates a severe protein loss. A value of 25 g/L indicates a depletion of two thirds of the total body albumin. A 45g/L indicates a fair nutritional status.

5. The causes of malnutrition in a surgical patient include all the following, except:

- A. Carcinoma of the oesophagus.
- B. Carcinoma of the stomach.
- C. Extensive small bowel resection.
- D. Chronic duodenal ulcer.
- E. Chronic empyema.

D. Duodenal ulcer patients tend to take frequent snacks because food reduces pain. Malnutrition is either caused by starvation (as cancers of oesophagus and stomach), mal-absorption (as in short bowel syndrome), and by sepsis (as empyema). The latter markedly raises the daily nutritional requirements.

6. All the following conditions cause hypercatabolism, except:

- A. Iliofemoral deep vein thrombosis.
- B. Major trauma and burns.
- C. Major surgical procedures.
- D. Severe acute pancreatitis.
- E. Major sepsis, e.g., peritonitis and septicaemia

A. Choices B to E all induce systemic inflammatory response syndrome (SIRS) with consequent catabolism.

7. Ten days after right hemicolectomy, a patient develops an external fistula that discharges about 100ml/day. There is no evidence of sepsis and the patient passes regular daily motions. The suitable method of supplying his nutritional needs is:

- A. Oral intake of a regular diet.
- B. Nasogastric fluid feeding.
- C. NPO and jejunostomy feeding.
- D. NPO and total parenteral nutrition.
- E. Mixed oral and parenteral nutrition.

A. The majority of postoperative external intestinal fistulas heal spontaneously provided adequate nutrition is maintained, there is no distal obstruction and there is no special pathology at the affected bowel segment (cancer or Crohn's disease).

A fistula output that is less than 500ml/day categorizes it as low-output fistula. Regular oral feeding is the best in this case. Nutritional supplements can be added to the diet, e.g., protein preparations, vitamins and iron in cases of hypoproteinaemia or anaemia.

8. About jejunostomy feeding, all the following statements are true, except:

- A. It is a useful temporary feeding method after complex gastric operations.
- B. Jejunostomy feeding starts with elemental formulas then proceeds gradually to blenderised food.
- C. Jejunostomy feeds should be sterile.
- D. Jejunostomy feeding can cause colicky abdominal pain.
- E. Jejunostomy feeding can cause diarrhoea.

8. Unlike the stomach, the jejunum is highly sensitive, and feeding should be started with isotonic, sterile formulas (e.g., 5% D/W) at a slow rate, otherwise the patient develops distension, colics, and diarrhoea. The situation is likened to the "dumping syndrome" that follows gastric surgery. The tonicity and rate are gradually increased according to the patient's tolerance. When tolerated, commercially available formulas are preferred for jejunostomy feeding. These are either partially digested or elemental formulas that require no digestion and are, therefore, ready for absorption. These formulas usually supply 1000 kcal and 5 g nitrogen/L. The fat content provides 30-40% of energy, and supplies essential fatty acids. Minerals, trace elements, and vitamins are also incorporated. Two to three litres are usually adequate to cover the usual daily requirements of an adult.

9. The complications and disadvantages of nasogastric tube feeding include all the following, except:

- High cost.
- Possibility of aspiration pneumonia.
- Pharyngitis.
- Oesophagitis.
- Nasal ulceration.

A. Nasogastric tube feeding is inexpensive. The stomach can withstand food at any temperature and any tonicity and the feed needs not be sterile. In fact, inexpensive blenderised food is suitable for nasogastric tube feeding.

The long-term presence of the tube invites nasal, pharyngeal and oesophageal irritation and ulceration.

The presence of the tube also keeps the oesophagogastric junction continuously open. This invites reflux and may cause pulmonary aspiration, particularly in a comatose patient.

10. About total parenteral nutrition (TPN), all the following statements are true, except:

- The main source of energy is 25% dextrose.
- Amino acids can be mixed with dextrose in a 3l bag.
- The rate of parenteral nutrition administration is better regulated by a pump.
- For TPN a central venous line is needed.
- Metabolic control is better maintained by TPN than by enteral nutrition.

E. Whenever the gut is functioning it should be used for providing nutrition because it has the following advantages over the parenteral route:

- Less expensive.
- Safer, less complications.
- Easier nutritional control.

11. All the following are possible complications of parenteral nutrition, except:

- Metabolic alkalosis.
- Hyperglycaemia.
- Hypoglycaemia.

- D. Hypokalaemia.
- E. Trace elements deficiency.

A. Parenteral nutrition is not physiological. The frequency and seriousness of complications require close monitoring. Metabolic alkalosis, however, is not known to be one of its complications.

12. About intravenous lipid preparations, all the following statements are true, except:

- A. They provide energy at a ratio of 9 kcal/ 1g fat.
- B. They provide essential fatty acids.
- C. They make the main source of energy of total parenteral nutrition (TPN).
- D. They can be given through a peripheral vein.
- E. They are not mixed with glucose and amino acids in the same bag.

C. The main source of energy in a TPN formula is 25% dextrose. Lipids give additional energy, but more important is that they provide essential fatty acids. They, therefore, need not be given daily.

While concentrated dextrose and amino acids should be given in a central vein, lipid preparations have the advantage of the possible administration through a peripheral vein.

13. The following are possible complications of total parenteral nutrition, except:

- A. Gut barrier failure occurs within 10 days.
- B. Septicaemia.
- C. Pneumothorax.
- D. Subclavian artery injury.
- E. Subclavian vein thrombosis.

A. Long-term absence of enteral feeding may lead to atrophy of intestinal mucosa. This allows for "translocation of bacteria" from the lumen to the blood stream, a situation that leads to septicaemia in the critically ill patients. A more frequent cause of septicaemia, however, is central line infection.

Pneumothorax and subclavian artery injury are complications of insertion of a central venous line. After insertion of such a line a chest X-ray should be done prior the administration of IV fluids in order to ensure that the catheter is in proper place.

14. About central venous line infection, all the following statements are true, except:

- A. Unexplained fever is the alerting sign.
- B. The condition causes serious septicaemia.
- C. Prophylactic antibiotics prevent central venous line infection.
- D. The venous catheter should be removed and its tip sent for culture and sensitivity.
- E. Therapeutic antibiotics should be immediately started without knowing the type of organism.

C. Fever that cannot be explained by any other cause should be considered to be due to central venous line infection. This is a cause of fatal septicaemia. For this reason, once suspected, the venous catheter should be removed and its tip is sent for culture and sensitivity. Therapeutic IV antibiotics should be started immediately and are modified when the sensitivity results are available.

Prophylactic antibiotics do not prevent its occurrence. They may even predispose to candida infection of the catheter. Measures that can reduce its incidence include:

- Placing the catheter under complete aseptic precautions.
- The entry site is inspected every other day, treated with antiseptic, and covered with sterile impermeable dressing.
- The drip tubing should be changed daily.
- The venous line should never be used for giving or withdrawing blood or for drug administration.

15. About home parenteral nutrition, all the following statements are true, except:

- A. Its main indication is short bowel syndrome.
- B. Its use is a contraindication to oral feeding.
- C. 3L bags are prepared in the hospital pharmacy under laminar flow.
- D. A pump is used to regulate its intake.
- E. A silastic catheter with a cuff is better used for this purpose.

B. Patients with short bowel syndrome who receive home parenteral nutrition are encouraged to use their gut. They are advised to gradually increase oral intake, as tolerated, over many months. This prevents atrophy of intestinal villi and can even stimulate their hyperplasia in order to increase the absorptive capacity of the small intestine. Oral intake can also provide fine adjustment to metabolic regulations.

For long-term parenteral feeding and for cancer chemotherapy administration, a Hickman catheter is in common use. This is a silastic catheter as it causes less irritation of venous wall, and has a subcutaneous Dacron cuff that helps to reduce infection.

Choose the single best answer

1. The axillary lymph nodes are divided into three levels I, II and III by

- A. The axillary artery.
- B. The axillary vein.
- C. The pectoralis minor muscle.
- D. The clavicle.
- E. The nerve to latissimus dorsi.

C. The axillary lymph nodes make the main station for lymphatic spread of breast cancer. These lymph nodes are divided into three levels by the pectoralis minor muscle. Level I nodes is below the muscle, level II behind it and level III is above it. Lymph node deposits affect level I, then moves to level II and later on to level III. The higher the level of involvement, the worse is the prognosis.

2. About acute lactational breast abscess, one statement only is true:

- A. Is commonly multilocular.
- B. Weaning the baby is mandatory
- C. Aspirating pus by a wide bore needle is superior to incisional drainage as it avoids injury to lactiferous ducts
- D. Mammography is indicated if an abscess is suspected
- E. Treatment is essentially conservative by antibiotics

A. The breast parenchymal is divided by fascial septa. These septa cause multiloculation of a breast abscess. For this reason needle aspiration is usually inadequate and a breast abscess should ideally be incised to break through the septa and to convert the abscess into one cavity, thus allowing complete drainage. The golden rule for abscess treatment is "pus drainage". The use of antibiotics only is likely to convert an acute abscess into a chronic one. This is frequently referred to as "antibioma". In the breast a chronic abscess is difficult to distinguish from cancer. Weaning the baby is not necessary, particularly if the infant is a few months old. The patient can nurse it from the healthy breast. When the abscess is drained the patient evacuates milk from the affected side by a breast pump until it is convenient to her to nurse the baby from this side as well.

An acute abscess is very tender. The patient cannot withstand the breast compression that is required to take a mammogram. If in doubt of the diagnosis, ultrasound imaging is the best choice. It shows thick fluid collection within the breast.

3. The following statements about fibrocystic breast are all true, except:

- A. May be asymptomatic
- B. May cause nipple retraction.
- C. Is a cause of breast pain
- D. Produces breast nodularity.
- E. May cause discharge per nipple

B. Fibrocystic breast changes are very common. The condition may be asymptomatic. It may cause mastalgia (usually cyclic) or nipple discharge. Breast nodularity is commonly felt. Large cysts are felt as discrete lumps. When these lumps are surrounded by fibrosis, they are easily confused with breast cancer.

Nipple retraction may be developmental and dates to menarche, or may be recently developed in an adult female. The latter condition is almost always diagnostic of breast cancer.

4. Treatment of cyclic mastalgia may include all the following, except:

- A. Exclusion of malignancy and reassurance
- B. Avoidance of breast support
- C. Giving up caffeine consumption
- D. Bromocriptine 2.5 mg bid
- E. Danazol 100-200 mg bid.

B. Cyclic mastalgia is a common disorder. The patient is usually apprehensive about the possibility of malignancy. Once excluded and the patient is reassured, most patients will be relieved both psychologically and physically. Addition of simple analgesics will usually be enough for management. Other simple measures as breast support (particularly with heavy breasts) and stopping the intake of caffeine-containing beverages will further reduce pain. Medications as bromocriptine (anti-prolactin) and Danazol (modified testosterone) are occasionally used for the treatment of resistant cases.

5. The following statements about fibroadenoma of the breast are all true, except:

- A. Usually affects females in the second and third decades of life.
- B. May be multiple.
- C. Freely mobile.
- D. The lesion is easily excised as it is well encapsulated.
- E. If left untreated it turns malignant in 9% of cases within 15 years.

E. A fibroadenoma is a mixed epithelial and mesenchymal benign tumour. The peak age of appearance is late teens and early twenties. Multiple tumours may be discovered in the same time (synchronous) or appear months or years after the discovery of the first fibroadenoma (metachronous).

A very characteristic feature is its free mobility, so much so that it is called the "breast mouse". As a benign tumour it is well-encapsulated, a feature that makes its enucleation at surgery an easy task.

A fibroadenoma is not known to be precancerous or to be a risk factor for the development of malignancy.

6. Regarding breast cysts, one statement is true:

- A. The commonest is galactocele.
- B. Malignancy is suspected if the cyst is tense.
- C. Malignancy is suspected if the lump does not totally disappear after complete aspiration of fluid.
- D. Multiplicity of cysts raises suspicion of malignancy.
- E. In the majority of cases cyst excision is necessary.

C. The commonest cyst of the breast is that of fibrocystic breast disease. There may be a clinically palpable single or multiple cysts. In this case these cysts are the ones that are large enough to be felt. There will be other innumerable impalpable cysts in both breasts. A common presentation is that of an apprehensive woman who presents with a history of very recent development of a lump. The patient is usually certain that it has not been there the day before. Clinical examination, supported by breast ultrasound confirms the diagnosis of fibrocystic breast disease.

Assurance and aspiration bring relief.

A cyst is sometimes malignant. Malignant potential has no relation to the tension within the cyst. The presence of multiple cysts usually favours a benign nature.

Malignancy is suspected under three conditions:

- if the lump does not totally disappear after complete aspiration of fluid
- if the aspirate is blood-stained
- if the cyst fills again shortly (within days) after aspiration

Under the above conditions biopsy should be taken, either an excision biopsy or ultrasound-guided FNA of any solid component within the cyst.

7. The following statements about mammary duct ectasia are all true, except:

- A. May produce a mass similar to carcinoma in the axillary tail of the breast.
- B. May produce non-lactational mastitis and abscess.
- C. May produce a mamillary fistula.
- D. Anaerobic bacteria are commonly implicated.
- E. May present by nipple discharge.

A. The term "ectasia" means abnormal dilatation. The major breast ducts become abnormally dilated at an area close to their opening on the nipple, i.e., deep to the areola. Stasis of secretions in the dilated ducts invites infection that causes non-lactational mastitis, abscess or mamillary fistula. Discharge of thick oily fluid from the nipple is a common complaint. More importantly, if a chronic abscess develops it mimics the mass of breast cancer. Characteristically, however, the mass of mammary duct ectasia lies deep to the areola or deep to its border, where the pathology is present.

8. The commonest histological type of breast cancer is:

- A. Duct carcinoma in situ.
- B. Lobular carcinoma in situ.
- C. Invasive duct carcinoma.
- D. Invasive lobular carcinoma.
- E. Paget's disease of nipple.

C. Invasive duct carcinoma accounts for about 75% of breast cancer cases. Paget's disease of the nipple is, in fact, a rare variant of duct carcinoma that arises in one of the main lactiferous ducts at its opening on the nipple. It, therefore, presents with nipple erosion.

9. A woman has a 3 cm breast mass. There are neither palpable axillary lymph nodes nor clinical evidence of metastasis. FNAC proves the presence of invasive duct carcinoma. TNM clinical staging is:

- A. T1 N1 M1
- B. T1 N0 M0
- C. T2 N2 M0
- D. T2 N1 M0
- E. T2 N0 M0

E. *T stands for tumour size. A tumour between 2-5 cm is T2.
N stands for lymph node status. Impalpable axillary nodes is N0.
M stands for metastases. M0 means no metastases.*

10. Breast self-examination:

- A. Is recommended for all women above the age of twenty.
- B. Is recommended for women above the age of 40 only.
- C. Is recommended to be done monthly in the immediate premenstrual period.
- D. Is recommended to be done twice yearly.
- E. Should be conducted in the presence of a specialist surgeon.

A. *All women over age 20 should be advised to examine their breasts monthly, one week after the menstrual period. This is the time when the breast is least engorged thus allowing easy feeling of an abnormal lump. The physician instructs the women as how to conduct a systematic inspection and palpation. If the woman suspects the presence of a lump, skin dimpling, or recent nipple retraction, she should report to the surgeon.*

11. The following statements about mammography are all true, except:

- A. Indicated for the diagnosis of a breast lump.
- B. Indicated for regular screening of women who are at high-risk of development of breast cancer.
- C. Indicated for follow-up of contralateral breast after mastectomy for breast cancer.
- D. More informative in young women below the age of 35 years.
- E. Addition of ultrasound improves the diagnosis of breast cancer.

D. *Mammography is indicated for:*

- *The diagnosis of a palpable breast mass. Breast cancer appears as a dense opacity that has an indefinite outline from which irregular spicules penetrate into the surrounding breast tissue. Accuracy of diagnosis is markedly enhanced when combined with the clinical picture and a biopsy, e.g., FNA. The combination of clinical assessment, imaging (mammography and ultrasound) and FNA is called triple test. When the three parts of the test are concordant with cancer, the diagnosis is confirmed and management proceeds according to the stage.*
- *Screening of asymptomatic females, particularly those who are at risk, namely, those with a mother or sister who had breast cancer, those who had previous treatment of cancer on one side, and those who are BRCA positive. Early breast cancer appears on mammography as a spots of microcalcification.*

The sensitivity of mammography in diagnosis of breast cancer is in direct proportion to the age and is indirectly proportionate to the breast density. This means that in a young female the breast parenchyma is too dense to allow for easy spotting of cancer opacity on a mammogram. With advancement of age, the breast parenchyma atrophies and detection of cancer becomes easier. This is why the addition of ultrasound examination improves diagnosis, particularly in young females.

12. The following statements about breast cancer prognosis are all true, except:

- A. Is worsened by the detection of axillary node deposits.
- B. Is better in estrogen receptor +ve cases.
- C. Is better for tumours in the medial than in the lateral half of the breast.
- D. Is worse for invasive duct carcinoma than for cystosarcoma phylloides.
- E. Is affected by the tumour grade.

C. For an oestrogen-positive tumour, there is an additional weapon to attack the tumour, which is the use of anti-oestrogen drugs.

Though most of lymphatic drainage of the whole breast is directed to the axillary nodes, a medially placed tumour may also spread to the internal mammary nodes.

Cystosarcoma phylloides is a highly cellular type of fibroadenoma that tends to grow rapidly. The term cystosarcoma is a misnomer as many are not cystic, and it is rarely malignant. It is, therefore, better termed "Phylloides tumour".

13. The following statements about Paget's disease of the nipple are all true, except:

- A. Is lobular carcinoma arising at the opening of a lactiferous duct on the nipple.
- B. Should be differentiated from eczema of the nipple.
- C. Sometimes there is no palpable mass.
- D. Mastectomy is indicated.
- E. The disease is not related to Paget's disease of bones.

A. Paget's disease of the nipple is a rare variant of duct carcinoma that arises in one of the main lactiferous ducts at its opening on the nipple. It accounts for about 1% of breast cancers. The first symptom is often an abnormal pricking sensation of the nipple, with superficial erosion. A tumour mass may not be palpable. The lesion is commonly mistaken for eczema.

14. Regarding axillary node involvement in cancer of the breast, all the following statements are true, except:

- A. Clinical assessment of the axilla is commonly inaccurate.
- B. Prognosis is affected by the number of affected nodes.
- C. Is an indication for adjuvant chemotherapy in early cases.
- D. Is an indication for adding irradiation of the axilla after its surgical evacuation.
- E. Raises suspicion of distant microscopic spread.

D. In a case of breast cancer clinical assessment of the axillary lymph nodes is known to be notoriously inaccurate. Sometimes palpable nodes turn out to be negative for malignancy. Above

frequently, malignant axillary nodes cannot be felt by the examiner. Ultrasound examination is a useful aid for preoperative evaluation of the axilla.

Prognosis is affected by the number of affected nodes. The larger the number and the higher the level of affected nodes, the worse is the prognosis.

The presence of malignancy in the axillary lymph nodes is an indication for a high possibility of distant spread. In a patient with early breast cancer, even with no evidence of distant spread, the detection of axillary node deposits is an indication for chemotherapy in order to kill possible distant micrometastases that could not be seen by imaging studies.

When the axillary nodes are removed, irradiation of the axilla is contraindicated as it dramatically raises the possibility of arm oedema. Radiotherapy obliterates the few remaining lymphatics that drain the arm.

15. The following statements about pulmonary metastases of breast cancer are all true, except:

- A. May be asymptomatic.
- B. May produce persistent cough.
- C. May produce dyspnoea.
- D. May cause pleural effusion.
- E. If localized to one lung while the other lung shows good function, pneumonectomy is indicated.

E. In a case of breast cancer excision of a distant metastatic deposit does not improve prognosis. To the contrary, it exposes the patient to the risk of un-necessary surgery.

This policy is useful only in case of colorectal cancer with liver metastases provided that the primary tumour is resectable and that the liver deposits are localized in order to allow for adequate hepatic function after their resection.

16. Haematogenous spread of breast cancer may produce any of the following, except:

- A. Brain metastases
- B. Fracture of the spine
- C. Pleural effusion
- D. Jaundice
- E. Hypocalcaemia

E. Haematogenous spread of breast cancer may affect the lungs, the liver, the brain and the bones. Bone metastases are osteolytic. If extensive bone affection occurs, the serum calcium is elevated rather than depressed. In fact, one of the oncologic emergencies that may occur with advanced breast cancer is acute hypercalcaemia.

17. Concerning sampling of a breast lump, all the following statements are true, except:

- A. The most accurate is excision biopsy.
- B. Fine needle aspiration cytology does not require general anaesthesia.
- C. Fine needle aspiration cytology shows tissue architecture.
- D. Frozen section biopsy is sometimes inconclusive.
- E. Tru-cut biopsy obtains a core of tissue.

C. Histopathological assessment of a tumour requires examination of a piece of tissue. Histopathology assesses both cellular morphology and tissues architecture, i.e., how cells are arranged, either making glandular structures or just formless sheets and more importantly invasion of the basement membrane.

On the other hand, cytology that is obtained by a fine needle requires examination of cells. FNAC (fine needle aspiration cytology) retrieves cells from the tumour. Examination of these cells cannot assess architecture but depends only on the presence of malignant criteria in cell morphology, e.g., pleomorphism, large nuclei and multiple nucleoli.

While histopathology is more accurate as it depends on both cellular morphology and tissue architecture, FNAC is simpler and can be done in the outpatient department.

Tru-cut biopsy obtains a core of tissue under local anaesthesia. This tissue is suitable for histopathology examination. It is, however, less likely to hit the tumour than FNAC. A fine needle is passed in different directions while aspirating and is, therefore, unlikely to miss the tumour.

18. The following statements about lymphatic drainage of the breast are all true, except:
- Lymph from medial half of the breast may drain in internal mammary nodes.
 - From anywhere in the breast lymphatics drain mostly to axillary nodes.
 - Division of axillary nodes into levels I, II, and III depends upon the anatomical relationship with the pectoralis minor muscle.
 - Level one axillary nodes is the highest in the axilla.
 - The sentinel node is the earliest axillary node to be involved with cancer spread.

D. Level I is the lowest, while level III lymph nodes is the highest in the axilla.

It is the policy in many centres to biopsy the sentinel lymph node. At surgery a radio-isotope and/or a blue dye is injected in the vicinity of the tumour and is traced by Geiger counter and by vision to find out the first lymph node(s) to drain the tumour. This node is excised and is histologically examined immediately. If it is negative for malignancy there will be no need for further excision of axillary nodes and the patient is spared the risk of postoperative arm oedema.

19. Regarding duct carcinoma in situ of the breast, one statement only is true:
- May be discovered on screening mammography for asymptomatic women.
 - Is not a true malignancy.
 - It does not progress to invasive cancer but is a powerful marker of increased cancer risk.
 - Close observation is all that is needed.
 - Is always bilateral.

A. In situ duct carcinoma is a true malignancy. It is the in situ lobular carcinoma that is not a true malignancy. It is, however, a strong predictor of future development of breast cancer. In situ duct carcinoma requires excision. Lobular carcinoma tends to be bilateral.

20. Early breast cancer:
- Means a T1 N1 M0 tumour or less.
 - Means that cure is impossible.
 - Means that microscopic metastases are not present.

- D. Primary treatment is by surgery $\pm$ radiotherapy.
- E. Adjuvant chemotherapy is not indicated.

D. Early breast cancer is T2N1M0 or less. It means a potentially curable disease. N1 denotes enlarged mobile axillary nodes. The presence of axillary node deposits is an indicator of the high possibility of distant micrometastases. This requires adjuvant chemotherapy to get rid of this possibility.

21. For modified radical mastectomy all the following statements are true, except:

1. The areola and nipple are removed.
2. The whole breast tissue is removed.
3. Block dissection of the axillary nodes requires excision of axillary vein.
4. Nerve to serratus anterior should be spared.
5. The pectoralis major muscle is spared.

C. Whatever the operation is, the axillary vein should be spared, otherwise the patient develops bad venous insufficiency.

The pectoralis major is removed in a classic radical mastectomy, which is rarely, if ever done nowadays. Sparing this muscle is found to have no negative effect on prognosis. Furthermore, keeping the pectoralis major muscle intact avoids the unsightly depression that follows the standard radical mastectomy.

The nerve to serratus anterior should also be spared, otherwise winging of the scapula occurs.

22. The following statements about post-mastectomy arm oedema are all true, except:

- A. Is always transient.
- B. Adding radiotherapy to the axilla after clearance of lymph nodes increases the risk of oedema.
- C. Rough dissection of the axillary vein at surgery is one of the causes.
- D. Insertion of an IV line in the ipsilateral upper limb is a predisposing factor.
- E. May be caused by recurrence in the axilla.

A. Post-mastectomy arm oedema is usually a troublesome chronic problem. After axillary lymph node removal fewer lymphatic vessels will remain. These are just enough to drain the arm.

Additional insults will obliterate the remaining lymphatics. Examples are:

- Infections of the upper limb will cause lymphangitis and obliterate them.
- Radiotherapy.
- Recurrence in the axilla.

In addition, if axillary vein thrombosis occurs the other route of upper limb drainage is also obliterated.

23. Acute hypercalcaemia in a patient with advanced breast cancer:

- A. Is caused by parathyroid hyperplasia.
- B. Is better treated at home.
- C. Bilateral lower limb oedema is a constant feature.
- D. IV fluid administration is an important line of treatment.

E. Chemotherapy is the main method of reducing serum calcium.

D. Acute hypercalcaemia is a life-threatening oncologic emergency. It occurs when there are heavy bone metastases. The main line of treatment is IV hydration and diuretics.

24. Neo-adjuvant therapy for malignancy means:

- A. Treatment with modern methods.
- B. Giving chemo and/or radiotherapy before surgery.
- C. Giving chemotherapy after radical excision.
- D. Giving radiotherapy after palliative excision.
- E. Giving chemotherapy after palliative excision.

B. Adjuvant therapy is a secondary line of treatment that improves the function of the primary treatment agent. For cancer treatment adjuvant therapy is understood to be chemo- and/or radiotherapy to be administered after surgery. The term neoadjuvant signifies that the chemo- and/or radiotherapy will be given before surgery. The purpose is to reduce the size of a locally advanced disease and make it amenable to radical surgical excision.

25. When screening females for breast carcinoma what is the most significant risk?

- A. Three previous breast biopsies in premenopausal females.
- B. More than 2 first degree relatives with ovarian or breast carcinoma.
- C. Hyperplasia in breast biopsy.
- D. None of the above.

B. The patients with more than 2 first-degree relatives with carcinoma have about 7% increased risk of developing breast cancer.

26. What is the hereditary factor percentage in female breast cancers?

- A. 20-30%.
- B. 45-50%.
- C. 6-10%.
- D. 75-80%.
- E. None of the above.

C. About 6-10% of cancers of the breasts are hereditary. Women are affected by breast cancer at a young age (40 years or less), about 10% of them have mutation in one of the breast cancer genes - BRCA1 and BRCA2. Mutation is more common in women having first and second degree relatives affected by premenopausal ovarian or breast cancer.

1. About abdominal incisions, all the following statements are true, except:

- A. The incision should provide good exposure to the target area.
- B. Muscle-splitting incisions are less likely to result in incisional hernia than muscle-cutting ones.
- C. A transverse suprapubic incision results in a better-looking scar than a lower midline incision.
- D. Atelectasis is more frequent after laparoscopy than after an upper midline incision.
- E. Laparoscopy scars are better-looking than laparotomy scars.

D. The small incisions of laparoscopic operations produce less postoperative wound pain than long incisions, particularly upper abdominal ones. The patient is better able to breathe deeply and to cough in order to expel bronchial secretions. Hence, postoperative atelectasis is less frequent after laparoscopy than after open surgery.

2. About abdominal incisions, all the following statements are true, except:

- A. Midline incisions take longer time to make and to close than paramedian ones.
- B. In a paramedian incision, the rectus abdominis is retracted laterally.
- C. A midline incision can be extended from the xiphoid to the symphysis pubis.
- D. A paramedian transrectal incision results in a weaker scar than a classic paramedian incision.
- E. A subcostal incision can injure intercostals nerves.

A. When doing a midline incision, cutting through one layer, the lineal alba, allows the surgeon to reach the parietal peritoneum. In a paramedian incision, the anterior rectus sheath has to be incised, the rectus muscle should be retracted laterally and then the posterior rectus sheath has also to be divided, in order to reach this peritoneal layer. Therefore, a paramedian incision takes longer to make and to close than a midline incision.

A subcostal incision can injure the eighth, ninth or tenth intercostal nerves with subsequent hypoesthesia or paralysis of a part of the abdominal wall.

3. For closure of a midline abdominal incision, all the following statements are true, except:

- A. It can be closed by either interrupted or continuous fascial sutures.
- B. Fascial sutures should be placed at least 1cm from the edge.
- C. Peritoneal closure does not add to the wound's tensile strength.
- D. Fascial sutures should be tied under tension in order to avoid burst abdomen.
- E. Polypropylene is suitable for linea alba closure.

D. Both continuous and interrupted sutures are suitable for linea alba closure. What is important is to take wide bites, at least 1cm from its edge with non-absorbable material. Polypropylene sutures are monofilament and non-absorbable. They are, therefore, perfect for this task.

The parietal peritoneum can be left without closure. It does not add to the wound's tensile strength. The peritoneum actually regenerates to bridge any defect, without suturing, within 1-2 days. Furthermore, its suturing creates an ischaemic line that invites adhesions to the omentum and intestine.
As a rule, no sutures, anywhere in the body, are to be taken under tension. Tension causes tissue ischaemia and finally sutures will cut through this friable ischaemic tissue, leading to incisional hernia or burst abdomen.

4. About complications of abdominal incisions, all the following statements are true, except:

- A. Incisional hernia and burst abdomen have the same predisposing factors.
- B. The presence of a synthetic mesh in the wound increases the incidence of infection.
- C. Wound infection is a strong factor that predisposes to incisional hernia formation.
- D. Not all wound haematomas require drainage.
- E. Keloids affect people with fair-skin more than those with dark skin.

E. The causes of incisional hernia are the same as burst abdomen. Actually these are two grades of wound failure. As a matter of fact, many patients with incisional hernia had partial disruption of the deeper layers of the abdominal wound during the early post-operative period.

The presence of any prosthetic material in a wound increases the incidence of infection and makes its eradication very difficult, except after its removal.

Wound infection is the commonest cause of incisional hernia formation.

Small wound haematomas should be left undisturbed and the body will absorb them without ill effects.

Keloid formation is far more prevalent in people with dark skin.

5. Any of the following can predispose to burst abdomen, except:

- A. Postoperative serum albumin 20g/L.
- B. Postoperative serum potassium 2mmol/L.
- C. Postoperative serum calcium 7mg/dL.
- D. Cushing's syndrome.
- E. Wound infection.

C. A low serum albumin impairs wound healing and predisposes to ascites. The latter raises intra-abdominal tension, thus putting the incision line under undue tension.
Hypokalaemia also raises intra-abdominal pressure by causing bowel distension that may amount to paralytic ileus.

Disturbances of serum calcium levels do not affect wound healing.
Cushing's syndrome is characterized by excess glucocorticoid release in the circulation. These steroids are known to impair wound healing. Prolonged corticosteroid therapy produces the same effect.

Wound infection makes the tissues friable, thus allowing sutures to cut through them.

6. About burst abdomen, all the following statements are true, except:

- Soaking of the wound dressing is an early sign.
- It usually occurs on the first postoperative day.
- Urgent surgery under general anaesthesia is indicated.
- The abdominal wall is closed as one layer.
- Sutures are retained for at least three weeks.

B. Burst abdomen usually occurs on 6th to the 8th day post-operatively. A warning sign to the occurrence of burst is "the red sign" where a serosanguineous discharge soaks the dressing. The abdominal wall is closed as one layer by through-and-through sutures using strong non-absorbable suture material, e.g., polypropylene. These are called "retention sutures" as they are retained for at least three weeks.

7. About laparoscopic surgery, all the following statements are true, except:

- Operations for treatment of gastro-oesophageal reflux can be done laparoscopically.
- Inguinal hernia repair can be done laparoscopically.
- The peritoneal cavity is inflated with carbon dioxide gas.
- Previous abdominal surgery is a contraindication to laparoscopy.
- Post-laparoscopy pain is less than post-laparotomy pain.

D. Practically all abdominal operations can now be done by laparoscopy. Even abdominal wall hernias can be repaired laparoscopically.

The peritoneal cavity is inflated with gas in order to allow:

- Safe introduction of instruments, the abdominal wall being lifted away from the viscera.
- Some distance between the telescope tip and the viscera in order to permit visualization.
- Working space that permits free movements of instruments.

Carbon dioxide is an inert gas that allows safe use of electrocautery. It is, therefore, the standard choice for creating pneumoperitoneum.

Previous abdominal surgery is not a contraindication but needs more caution while doing laparoscopy. This is because intestinal adhesions to the abdominal wall are likely to be present.

There are ways to avoid intestinal injury in such cases. Examples are:

- Insufflate the abdomen and introduce the first trocar away from the scar.
- Access the peritoneal cavity by a small incision in order to place the first trocar under direct vision.
- Use an optical trocar.

Laparoscopy certainly causes much less pain than laparotomy. The advantages are:

- Less need for analgesia.
- Early ambulation that reduces the incidence of deep vein thrombosis.
- Better ability to cough that reduces the incidence of atelectasis.
- Shorter hospital stay.
- Early return to work.

8. Anomalies of the vitello-intestinal duct include all the following, except:

- Umbilical hernia.

- B. Umbilical sinus.
- C. Umbilical granuloma.
- D. Umbilical fistula.
- E. Meckel's diverticulum.

A. The development of any type of umbilical hernia is not related to anomalies of this duct.

9. About Richter's hernia, one statement only is true:

- A. It means a hernia that contains Meckel's diverticulum.
- B. It means that a viscus makes part of the wall of the sac.
- C. It means an irreducible femoral hernia.
- D. This is a hernia through the lumbar triangle.
- E. Strangulation does not cause intestinal obstruction.

E. The content of a Richter's hernia is only a part of the bowel circumference. That is why the intestinal lumen is not obstructed if strangulation occurs.

A hernia that contains Meckel's diverticulum is called Littre's hernia.

A hernia where a viscus forms part of the wall of the sac is called sliding hernia.

10. A 30-year old man noticed intermittent appearance of a painless right side scrotal swelling. On examination it was found to be inguinoscrotal. The most likely diagnosis is:

- A. Right femoral hernia.
- B. Right direct inguinal hernia.
- C. Right oblique inguinal hernia.
- D. Right vaginal hydrocele.
- E. Epididymo-orchitis.

C. Intermittent appearance of a groin swelling goes with the diagnosis of a hernia.

The examiner holds the neck of the scrotum to define the position of this swelling. If the swelling is felt to expand the neck of the scrotum and to extend above and below the examiner's fingers, the swelling is judged to be inguinoscrotal. In this case the diagnosis is right oblique inguinal hernia.

Femoral hernias and, for practical purposes, direct inguinal hernias do not reach the scrotum. Vaginal hydrocele and epididymo-orchitis make purely scrotal swellings. Furthermore, epididymo-orchitis is painful.

11. All the following are constant manifestations of a strangulated hernia, except:

- A. Intestinal obstruction.
- B. Painful swelling.
- C. Tense and tender swelling.
- D. Irreducible swelling.
- E. No impulse on cough.

A. A strangulated hernia is commonly, but not always, associated with intestinal obstruction. It does not produce obstruction if:

- Contents are omentum.
- Richter's hernia (part of bowel circumference only is in the hernia).
- Littre's hernia (content is Meckel's diverticulum).

A strangulated hernia is always painful because of ischaemia of its contents.
The local signs of strangulated hernia are "tense, tender and irreducible swelling, with no impulse on cough".

12. About direct inguinal hernia, all the following are true, except:

- Commonly bilateral.
- Commonly affects young males.
- Presents as an inguinal swelling.
- Less likely to strangulate than an oblique hernia.
- Neck of the sac is medial to the inferior epigastric vessels.

B. Direct inguinal hernias usually affect elderly males whose abdominal muscles become weak. Elderly males are also prone to develop prostatic enlargement that causes straining at micturition.

13. About femoral hernia, one statement only is true:

- It is more frequent than umbilical hernias in females.
- It is more prone to strangulation than an inguinal hernia.
- It presents as a swelling above the pubic tubercle.
- The femoral vein lies posterior to its neck.
- At surgery for strangulation, the femoral ring is enlarged by dividing its lateral edge.

B. The high tendency of a femoral hernia to strangulate is due to:

- Its sinuous course.
- Difficult of its diagnosis, and consequently it passes untreated until it strangulates.

A femoral hernia presents by a swelling that lies below and lateral to the pubic tubercle. What gives a swelling above the pubic tubercle is the inguinal hernia.

The femoral vein forms the lateral boundary of the femoral ring.

To enlarge the constricting femoral ring at surgery, its medial boundary, the lacunar ligament, is divided. If an abnormal obturator vessel passes here, it is liable to cause troublesome bleeding. Cutting its lateral edge, however, injures the external iliac/femoral vein causing severe life-threatening haemorrhage.

14. About open surgery for the repair of an inguinal hernia, all the following statements are true, except:

- The operation can be done under local anaesthesia.
- The ilioinguinal nerve may be injured.
- The vas deferens may be injured.
- Repair of external oblique aponeurosis is the important factor that prevents recurrence.
- The external iliac vein may be injured.

D. The fascia transversalis makes the posterior wall of the inguinal canal. Strengthening this layer is the important factor that prevents recurrence.

15. At laparoscopic inguinal hernia repair, fixing the mesh by staples in the space between the vas deferens and the testicular vessels can cause injury to:

- A. Femoral nerve.
- B. Lateral cutaneous nerve of thigh.
- C. External iliac vessels.
- D. Inferior epigastric vessels.
- E. Abnormal obturator artery.

C. The vas deferens and the testicular vessels form the edges of the triangle of doom. It is so called because this space houses the external iliac vessels. Fixing a mesh with staples (or tackers) in this triangle is contraindicated as it can injure the vessels and exposes the patient to severe bleeding.

The lateral cutaneous nerve of thigh and the femoral nerve lie lateral to the testicular vessels; the area that is called the triangle of pain. Here placing staples is also contraindicated as the nerves can be compressed causing pain.

The third place where placing staples is contraindicated is the site of inferior epigastric vessels in the lower part of the anterior abdominal wall.

16. A 3-month-old boy presents with a reducible umbilical hernia, which has a 1cm defect. This is best managed by:

- A. Surgical repair with mesh at the age of one year.
- B. Immediate surgical repair without mesh.
- C. Laparoscopic repair with mesh at the age of one year.
- D. Laparoscopic repair without mesh.
- E. Periodic observation and evaluation.

E. It is rare that an infantile umbilical hernia causes any complications, as other hernias do. Furthermore, most disappear before the child reaches the age of four years.

- The parents should be assured that there is no need to worry about the protrusion.
- There is no need to keep the baby from crying, which is practically impossible.
- There is no need to apply a strap, a truss or a coin to close the defect.
- Indications for surgery are rare, and include:
 - An extremely large hernia.
 - The hernia does not disappear by the time the child is four.
 - The rare occasion of strangulation.

17. A 7-month-old boy presents with a right inguinal hernia. The best treatment is:

- A. Observation; and reserve surgery for cases where the hernia persists after the age of 5 years.
- B. Herniorrhaphy by Bassini's repair.
- C. Mesh hernioplasty.
- D. Right herniotomy.

E. Right herniotomy and exploration of the left side.

E. An inguinal hernia does not disappear on its own. Once it appears the sac is always there. In the paediatric age group, this is an oblique type; the one that is more likely to strangulate. Surgery is indicated at any age. In infants and children, the posterior wall of the inguinal canal is strong. Just excision of the hernia sac is enough to cure it. This is universally known as herniotomy (though the correct term should have been herniectomy). Inguinal hernias in infants and young children are commonly bilateral. It is wise to explore the other side in the same operation to look for an asymptomatic sac and to excise it. Contralateral exploration, however, is not advised while operating on a strangulated hernia.

18. About oblique inguinal hernia, all the following statements are true, except:

- A. The sac is present within the spermatic cord.
- B. The neck of the sac lies lateral to the inferior epigastric vessels.
- C. If it reaches the scrotum there is no need to do the internal ring test.
- D. Mesh repair is needed only for recurrent cases.
- E. Repair can be done under local anaesthesia.

D. A scrotal hernia is confidently diagnosed as an oblique (indirect) inguinal hernia. There is no need for diagnostic tests.

Except for children and adolescents, all inguinal hernias are better treated by mesh hernioplasty. This avoids tension on the tissues and, thus, reduces recurrence.

Repairing inguinal hernias under local anaesthesia is feasible and is a popular policy in North America. The patient goes home within a few hours, thus reducing hospital bed occupancy and reducing expenses.

19. About the surgical anatomy of inguinal hernia, one statement only is true:

- A. The internal inguinal ring is an opening in the internal oblique muscle.
- B. The external inguinal ring is an opening in the external oblique aponeurosis.
- C. The external ring is situated at the midpoint of inguinal ligament.
- D. Cremasteric muscle is derived from the transverses abdominis muscle.
- E. The ilioinguinal nerve lies within the spermatic cord.

B. The internal ring is an opening in the fascia transversalis. The external ring is above the medial end of the inguinal ligament. The cremasteric muscle is derived from the internal oblique. The ilioinguinal nerves lies in the inguinal canal but is outside the spermatic cord.

20. A 43-year old woman presents with a mildly painful swelling that is situated halfway between the xiphoid process and the umbilicus. The subcutaneous midline swelling is soft and is not reducible. The most probable diagnosis is:

- A. Fatty hernia of linea alba.
- B. Irreducible paraumbilical hernia.
- C. Subcutaneous lipoma.
- D. Subcutaneous neurofibroma.
- E. Spigelian hernia.

A. In this site, if one detects what feels like a lipoma, the diagnosis is most likely a fatty hernia of linea alba. A para-umbilical hernia is also a midline swelling but is situated at the edge of the umbilicus; more likely the upper than the lower. A Spigelian hernia is a rare type that is found at the outer border of the rectus abdominis, usually at the level of the arcuate line, i.e., in the lower half of the abdomen.

21. A 50-year old man had urgent midline laparotomy for the treatment of a perforated duodenal ulcer one year ago. He now presents with a painless reducible incisional hernia. Otherwise, he is in good health. The size of the defect is 10X10cm. One statement only is true:

- A. This hernia will not strangulate because it has a wide defect.
- B. A suitable method of repair is to use a polypropylene mesh.
- C. A suitable method of repair is to use a polygalactin mesh.
- D. A suitable method of repair is vertically overlapping the aponeurotic layer (double breasting).
- E. The operation should be urgently done.

B. A hernia with a wide neck is less prone to strangulation, but is not immune against this complication, particularly if there are adhesions and loculations within the sac. If the defect is big, direct approximation of aponeurotic edges by sutures puts tension on the repair and predisposes to recurrence. Overlap repair certainly causes more tension. This is why it has no place in modern surgical practice.

Repair without tension requires the use of a synthetic mesh to bridge the defect. It acts as scaffolding that permits growth of fibrous tissue through its pores. An absorbable mesh, like polygalactin provides short-term support only. In order to prevent recurrence a non-absorbable mesh, like polypropylene, is used to provide permanent support to the abdominal wall. Surgical repair is not urgent as the hernia is uncomplicated.

22. About Stoppa's technique of hernia repair, all the following statements are true, except:

- A. A small non-absorbable piece of mesh is used to plug the defect.
- B. The mesh is placed in the pre-peritoneal space.
- C. It can be done by open surgery.
- D. It is suitable for oblique inguinal hernia repair.
- E. It is suitable for direct inguinal hernia repair.

A. After excising (or reducing) the sac, a large piece of mesh is placed in the preperitoneal space in order to cover (not to plug) all groin area defects, whether they are direct inguinal, oblique inguinal or femoral. There is no need to stitch the mesh in place. Its large size is a guarantee against displacement or protrusion through a defect. The operation was originally described for open surgery, but the same principle is currently applied for laparoscopy.

Choose the single best answer

1. About APUD cells, all the following statements are true, except:
- These are of ectodermal origin arising from the neural crest.
 - Neoplasms of APUD cells may occur simultaneously in different organs.
 - APUD cell neoplasms are always malignant.
 - APUD cells are present in the islets of Langerhans.
 - APUD cells are present in the adrenal medulla.

C. APUD is an acronym that stands for the ability of these cells for Amine Precursor Uptake, and then their Decarboxylation to produce a variety of hormones. These are endocrine cells of ectodermal origin arising from the neural crest and migrate during intrauterine life to different organs in the body.

APUDomas may be isolated or occur in groups; the so called multiple endocrine neoplasia (MEN) syndromes. An APUDoma may be benign or malignant. The majority of insulinomas and pheochromocytomas are benign.

2. About multiple endocrine neoplasia (MEN) syndromes, all the following statements are true, except:

- The syndromes are non-hereditary.
- Neoplasms may be benign or malignant.
- Islet cell tumours of the pancreas are part of MEN I.
- Medullary carcinoma of the thyroid is a part of MEN II.
- Pheochromocytoma is a part of MEN II.

A. MEN syndromes are inherited autosomal dominant diseases.

MEN I (Wermer's syndrome)

- Parathyroid hyperplasia.*
- Islet cell tumours of the Pancreas (gastrinoma, or insulinoma)*
- Anterior Pituitary tumours (usually chromophobe adenoma)*

MEN II

MEN IIa (Sipple's syndrome)

- Medullary carcinoma of the thyroid.*
- Pheochromocytoma.*
- Parathyroid hyperplasia.*

MEN IIb

- medullary carcinoma of thyroid.*
- Pheochromocytoma.*
- Mucosal neuromas.*

As seen above, some of the neoplasms are benign while others are malignant e.g., medullary thyroid cancer and the majority of gastrinomas. The syndromes even contain parathyroid hyperplasia.

3. About the thyroid gland, one statement only is true:

- Thyroid follicular tissue arises from the third pharyngeal pouch.

- B. The parafollicular C cells arise from the floor of the developing pharynx.
- C. The thyroglossal duct is normally patent during the first few years of life.
- D. Thyroglobulin is stored in colloid that is present inside the thyroid follicles.
- E. The parafollicular cells secrete thyroid stimulating hormone.

D. The thyroid develops as proliferation of epithelial cells in the floor of the developing pharynx (the thyroglossal duct) at a point that is indicated by the foramen caecum, a depression at the base of the tongue. As the thyroid primordium descends, it unites with the ultimobranchial body which arises on either side from the fourth pharyngeal pouch. Parafollicular (C-cells) are derived from the neural crest and reach the thyroid via the ultimobranchial body. After the thyroid reaches its definitive location in the lower neck, the connecting thyroglossal duct undergoes obliteration.

The thyroid follicles secrete thyroid hormones. They are stored as thyroglobulin in a colloid that is present in these follicles. The parafollicular C cells secrete the hormone calcitonin.

4. About anatomy of the thyroid gland, one statement only is true:

- A. The thyroid is enclosed within the prevertebral fascia.
- B. The sternomastoid muscles lie anterior to the thyroid.
- C. The thyroid gland extends up to the level of the hyoid bone.
- D. Lymphatic drainage of the thyroid gland goes primarily to the submandibular lymph nodes.
- E. The carotid sheath crosses the anterior surface of the thyroid gland.

B. The thyroid gland is enclosed in a sheath of the pretracheal fascia, which is attached above to the thyroid cartilage. That is why the gland moves with deglutition.

The upper limit of the thyroid gland is the oblique line of the thyroid cartilage.

Thyroid lymphatics drain centrally to the prelaryngeal and the pretracheal lymph nodes, and laterally to the upper and lower deep cervical nodes that lie along the internal jugular veins.

5. About anatomical relations of the thyroid gland, all the following statements are true, except:

- A. The external laryngeal nerve is related to the superior thyroid vessels.
- B. The recurrent laryngeal nerve is related to the inferior thyroid artery.
- C. The recurrent laryngeal nerve lies in the tracheo-oesophageal groove.
- D. The sternohyoid and sternothyroid muscles lie superficial to the gland.
- E. The thyroid isthmus lies at the level of the cricothyroid membrane.

E. The recurrent laryngeal nerve comes into direct relationship with the terminal branches of the inferior thyroid artery. The nerve is usually posterior to the branches of the artery, but may pass anterior to or between these branches.

The thyroid isthmus overlies the second and third tracheal rings. There is no thyroid tissue over the cricothyroid membrane. This fact is important because it makes emergency cricothyroidotomy an easy and rapid way to access the airway.

6. About the blood vessels of the thyroid gland, all the following statements are true, except:
- A. The superior thyroid artery is a branch of the external carotid artery.
 - B. The inferior thyroid artery is a branch of the common carotid artery.
 - C. The superior thyroid vein drains into the internal jugular vein.
 - D. The middle thyroid vein drains into the internal jugular vein.
 - E. The inferior thyroid veins drain into the left innominate vein.

B. The inferior thyroid artery is a branch of the thyrocervical trunks of the subclavian artery. The common carotid artery has only two terminal branches; the external and internal carotid arteries.

7. About the physiology of the thyroid gland, all the following statements are true, except:

- A. Iodine is necessary for the synthesis of thyroid hormones.
- B. The thyroid stimulating hormone (TSH) is secreted by the anterior lobe of the pituitary gland.
- C. TSH stimulates the synthesis and release of hormones from the thyroid gland.
- D. Total T4 and T3 more accurately reflect the thyroid function status than the free T4 and T3.
- E. Calcitonin stimulates the precipitation of calcium in bones.

D. Total serum T4 and T3 are affected by fluctuations in the levels of the thyroxine binding proteins (namely thyroid binding globulin and pre-albumin). False elevated levels of total serum T3 or T4 accompany pregnancy and oral contraceptive intake. On the other hand false low results occur with hypoproteinaemia, e.g. nephrotic syndrome.

8. About congenital anomalies of the thyroid gland, all the following statements are true, except:

- A. The thyroglossal duct is intimately related to the central part of the hyoid bone.
- B. A thyroglossal fistula follows opening of a thyroglossal cyst.
- C. A thyroglossal cyst always lies in the isthmus of the thyroid gland.
- D. A thyroglossal cyst moves up with protrusion of the tongue.
- E. Treatment of a thyroglossal cyst entails removal of the cyst and the thyroglossal tract.

C. The thyroglossal duct (or the residual tract) is intimately related to the central part of the hyoid bone. This has two practical applications. It explains why a thyroglossal cyst moves up with tongue protrusion. This also explains the need to remove the central part of the hyoid bone with thyroglossal cyst and fistula surgery.

A thyroglossal cyst may be present at any level from the foramen caecum of tongue to the suprasternal notch, usually in the midline just below the hyoid bone except at the level of the thyroid cartilage, where it is displaced usually to the left.

A thyroglossal fistula is always acquired, though it has a congenital basis. The development of a fistula follows either spontaneous rupture or incision and drainage of infected thyroglossal cyst.

It may also follow inadequate surgical excision of the cyst. Compare this with a branchial fistula which is always present since birth.

9. All the following statements about thyroiditis are true, except:

- A. Subacute thyroiditis is caused by viral infection.
- B. Subacute thyroiditis predisposes to thyroid lymphoma.
- C. Hashimoto's thyroiditis is an autoimmune disease.
- D. Hashimoto's thyroiditis ultimately ends in hypothyroidism.
- E. Riedle's thyroiditis is a rare disease that simulates anaplastic thyroid carcinoma.

B. It is Hashimoto's thyroiditis that predisposes to thyroid lymphoma. Though there may be an initial transient phase of hyperthyroidism, Hashimoto's thyroiditis ultimately ends in hypothyroidism.

10. About the aetiology of simple goitre, all the following statements are true, except:

- A. Pendred's syndrome is characterized by hypothyroidism, goitre and blindness.
- B. Pendred's syndrome is caused by deficiency of peroxidase enzyme.
- C. Deficiency of iodine causes simple goitre.
- D. Pregnancy raises the need for iodine.
- E. Thiocyanates in cabbages are goitrogenic.

A. Pendred's syndrome is caused by deficiency of peroxidase enzyme which transforms iodides to organic iodine prior to binding with tyrosine. The patient is deaf and mute, but not blind. The commonest cause of a simple goitre, however, is deficiency of iodine. Simple goitre is endemic in regions with low iodide content of water and food as in mountains and desert areas away from seas. Relative deficiency of iodine occurs during periods of stress. Females during the menarche, pregnancy and lactation are susceptible to this problem.

11. About management of a clinically simple multinodular goitre, all the following statements are true, except:

- A. Thyroid function tests are necessary.
- B. Assessment of the titres of thyroid antibodies is needed to exclude Hashimoto's disease.
- C. A dominant thyroid nodule requires assessment with FNA.
- D. Thyroid isotope scan is the imaging study of choice in this case.
- E. A small uncomplicated simple nodular goitre may not need surgery.

D. Assessment of thyroid functions is necessary because these patients may have subclinical hyp or hyperthyroidism.

In a multinodular goiter, a dominant nodule that is larger than 1.5 cm deserves fine needle aspiration cytology in order to look for malignancy.

The imaging study of choice is ultrasound. Isotope scan is mainly needed for patients with hyperthyroidism. It helps in differentiating the types of thyrotoxicosis.

The indications for surgery for a simple multinodular goitre are:

- Evidence of compression manifestations mainly on the trachea.

- Suspicion of malignancy.
- For cosmetic reasons, according to the patient's request.

12. The possible complications of a simple multinodular goitre include all the following, except:

- Tracheal compression.
- Retrosternal extension.
- Haemorrhage in a nodule.
- Development of thyrotoxicosis.
- Hoarseness of voice.

E. Hoarseness of voice is a complication of malignant thyroid.

13. About retrosternal goitre, all the following statements are true, except:

- A retrosternal goitre usually develops in ectopic mediastinal thyroid tissue.
- Clinically the lower border of the goitre cannot be felt.
- Compression on the mediastinal veins causes the appearance of dilated pre-sternal and neck veins.
- Thyroidectomy is the only line of treatment.
- In most of cases surgery does not require a thoracotomy.

A. Retrosternal goitre is rarely caused by enlargement of ectopic thyroid tissue in the mediastinum. Usually it is a cervical goitre that moves down so that its lower part extends behind the manubrium sterni. This is why the blood supply of this goitre is obtained from the neck vessels, and hence, a cervical incision is usually enough to remove the gland.

14. A 17-year old female presents with a 3cm thyroid nodule. FNA shows papillary structures. There is no evidence of metastases. The appropriate treatment is:

- Thyroxine therapy.
- Radioactive iodine therapy.
- Excision of the nodule.
- Hemithyroidectomy.
- Total thyroidectomy.

E. The presence of papillary structures on FNA is enough proof that the patient has a papillary thyroid cancer. The primary treatment is surgery that is followed by thyroxine at high-enough doses to suppress TSH.

Hemithyroidectomy (removal of affected lobe and isthmus) is enough if the tumour is less than 1cm with no lymph node spread. This is called papillary microcarcinoma.

With larger tumours, as in this case, treatment is total thyroidectomy and removal of the central lymph nodes (prelaryngeal and pretracheal). If at operation the lateral lymph nodes are found to be involved, a modified radical neck dissection is added.

15. The clinical manifestations of thyroid malignancy include all the following, except:

- Neck pain.

- B. Progressive enlargement of a neck mass.
- C. Hoarseness of voice.
- D. Jaundice.
- E. A hard and fixed thyroid nodule.

D. Thyroid cancer does not tend to spread to the liver. Blood spread is through the systemic veins, to the lungs and bones.

16. One of the following cancers may be multicentric:

- A. Papillary carcinoma of the thyroid.
- B. Follicular carcinoma of the thyroid.
- C. Anaplastic carcinoma of the thyroid.
- D. Medullary carcinoma of the thyroid.
- E. Carcinoma of the parathyroid.

A. More than 30% of papillary cancers are multicentric. This fact favours its treatment with total thyroidectomy.

17. About papillary thyroid cancer, all the following are true, except:

- A. It is the commonest thyroid cancer.
- B. It usually affects teen-agers.
- C. It usually spreads by lymphatics.
- D. A high TSH helps its growth.
- E. It secretes calcitonin.

E. Papillary and follicular thyroid cancers are collectively called "differentiated thyroid cancer". They secrete thyroid hormones, not calcitonin. It is medullary carcinoma that secretes calcitonin. Calcitonin is the tumour marker for medullary carcinoma. Thyroglobulin is the marker for differentiated thyroid cancer.

18. About thyroid cancer, all the following statements are true, except:

- A. FNA is enough to diagnose follicular carcinoma.
- B. Anaplastic carcinoma spreads mainly by local infiltration of surrounding tissues.
- C. Spread of follicular carcinoma is mainly haematogenous.
- D. Malignancy appears as a cold nodule on thyroid isotope scan.
- E. The prognosis of differentiated thyroid cancer is better than the anaplastic type.

A. The finding of follicular cells in FNA is not a conclusive evidence of follicular carcinoma. Follicular cells can be also obtained from a follicular adenoma. The diagnosis of follicular carcinoma depends upon the demonstration of capsular or blood vessel invasion on histopathological examination of excised tissue. If a follicular carcinoma is suspected a hemithyroidectomy is the minimum excision biopsy that is done. On the other hand, the finding of papillary structures on FNA is diagnostic of papillary carcinoma because there is no such thing as papillary adenoma.

19. About the types of thyrotoxicosis, all the following statements are true, except:
- A. In Graves' disease the gland has no nodularity.
 - B. Plummer's disease is thyrotoxicosis that develops on top of a multinodular goitre.
 - C. Graves' disease is characterized by huge enlargement of the thyroid gland.
 - D. A solitary hyperactive thyroid nodule can cause thyrotoxicosis.
 - E. Hashimoto's disease and subacute thyroiditis can cause transient hyperthyroidism.

C. Graves' disease is thyrotoxicosis that develops in a previously healthy thyroid gland. There is only mild enlargement of the gland or none at all. The surface of the gland is characteristically smooth with no nodules. Exophthalmos is a common feature of Graves' disease.

20. The clinical manifestations of thyrotoxicosis include all the following, except:
- A. Palpitations.
 - B. Weight loss.
 - C. Exophthalmos.
 - D. Tremors.
 - E. Cyanosis.

E. Cyanosis is not one of the manifestations of thyrotoxicosis.

21. About treatment of Graves' disease all the following statements are true, except:
- A. Thyroidectomy is the first-line treatment.
 - B. Agranulocytosis is a possible complication of anti-thyroid drugs.
 - C. Radioactive iodine therapy is contraindicated during pregnancy.
 - D. Radioactive iodine therapy is better avoided in cases of exophthalmos.
 - E. If thyroidectomy is decided upon, toxicity should be controlled by medications prior to surgery.

A. The first-line treatment is anti-thyroid drugs. These are used for a period of 6 months to 2 years. The aim is to control toxicity until spontaneous remission occurs. These drugs can cause agranulocytosis and subsequent serious infections. In North America radioiodine therapy is gaining popularity as first-line treatment for Graves' disease. It is, however, contraindicated during pregnancy. It also tends to worsen exophthalmos.

The indications for surgery include:

- Failure or complications of conservative measures.
- Suspicion of malignancy.
- Large goitre, which is unusual in cases of Graves' disease.

Whether to do total or subtotal thyroidectomy is still a matter of debate among surgeons. Whatever the operation, thyrotoxicity should be controlled prior to surgery, by anti-thyroid drugs to bring the patient to a euthyroid status. Operating on uncontrolled thyrotoxicosis carries the risk of causing a fatal thyrotoxic crisis.

22. About toxic multinodular goitre, all the following statements are true, except:
- It usually affects patients at an older age than those with Graves' disease.
 - Exophthalmos is more prominent than in patients with Graves' disease.
 - Heart failure is more likely to occur than in patients with Graves' disease.
 - Goitre is usually sizable.
 - The first-line treatment is thyroidectomy.

B. Usually there is no exophthalmos in these patients.

Because it affects patients at an older age than primary thyrotoxicosis, they are more likely to develop heart failure.

Goitre is usually sizable because thyrotoxicity develops on top of a multinodular gland.

Anti-thyroid drugs tend to increase the size of the gland because they raise the level of the suppressed TSH. Radio-iodine therapy can control toxicity but causes little, if any, reduction in gland size. Thyroidectomy is the only method that controls both the size and toxicity of the gland.

23. About stridor in the postoperative period after thyroidectomy, all the following statements are true, except:

- Unilateral recurrent laryngeal nerve injury causes stridor.
- Dyspnoea due to deep neck haematoma should be immediately evacuated.
- Laryngeal oedema is a cause of stridor.
- Tracheal collapse due to tracheomalacia is a rare cause of stridor.
- External laryngeal nerve injury does not cause stridor.

A. Unilateral recurrent laryngeal nerve injury causes hoarseness of voice. Bilateral injury causes stridor.

A deep neck haematoma that causes stridor should be evacuated immediately, even as a bedside procedure. The sutures are removed to evacuate the compressing haematoma. The patient is then taken to the operating theatre for proper haemostasis.

Injury of the external branch of superior laryngeal nerve causes loss of high pitched voice.

24. About thyrotoxic crisis, all the following statements are true, except:

- It follows surgery on uncontrolled thyrotoxicosis.
- If untreated it can be fatal.
- It is caused by marked elevation of serum thyroid stimulating hormone (TSH).
- Hyperthermia and tachycardia are present.
- Treatment should be carried out in ICU.

C. Thyrotoxic crisis is caused by marked elevation of the circulating thyroid hormones, not TSH. The condition is highly fatal. It should be urgently managed in ICU. Treatment includes:

- Intravenous fluids.
- Cooling the patient, e.g. ice packs.
- Oxygen.
- Digoxin for heart failure.
- Sedation.

- Intravenous hydrocortisone.
- Carbimazole 15–20 mg/6 hours.
- Lugol's iodine 10 drops/8 hours or Na- or K-iodide intravenously as a drip.
- Propranolol 40 mg/6 hours orally or 1 mg intravenously as a drip to be repeated if needed.

25. About anatomy of the parathyroid glands, all the following statements are true, except:

- There are always four parathyroid glands.
- The superior parathyroids are derived from the fourth branchial pouches while the inferior glands are derived from the third pouches.
- The blood supply of the parathyroid glands is mainly from the inferior thyroid arteries.
- The inferior parathyroid glands may be present in the mediastinum.
- The inferior parathyroid gland is usually found near the intersection of the inferior thyroid artery and the recurrent laryngeal nerve.

A. Only in 80% of cases there are 4 glands which are symmetrical in position on both sides. In the remaining cases there can be more than 4 asymmetrically placed glands, or sometimes only 3 glands.

The inferior glands are more variable in position than the superior ones. They may migrate with the thymus gland to the mediastinum as both are derived from the third branchial pouches.

26. About primary hyperparathyroidism, one statement only is true:

- Commonest pathology is parathyroid hyperplasia.
- Serum calcium is reduced.
- Serum calcitonin is reduced.
- Osteoporosis is one of its consequences.
- Main line of treatment is chemotherapy.

D. The commonest pathology in cases of primary hyperparathyroidism is a parathyroid adenoma.

Serum parathormone (PTH) is elevated. It causes osteoporosis by mobilizing calcium from bone. This results in hypercalcaemia.

For primary hyperparathyroidism treatment is only surgical. The adenoma (or adenomas) is removed.

27. The manifestations of primary hyperparathyroidism include all the following, except:

- Bony pains.
- Renal colic.
- Epigastric pain.
- Easy fatigue.
- Normal serum calcium and high PTH.

E. Hyperparathyroidism is a "disease of bones, stones, abdominal groans, psychic moans and fatigue overtones".
PTH is elevated. Serum calcium is elevated in cases of primary hyperparathyroidism, but is normal in cases of secondary hyperparathyroidism. The commonest cause of the secondary type is renal failure.

28. The differential diagnoses of hypercalcaemia include all the following, except:

- A. Primary hyperparathyroidism.
- B. Bone metastases.
- C. Multiple myeloma.
- D. Tuberculosis.
- E. Sarcoidosis.

D. Primary hyperparathyroidism is the commonest cause of hypercalcaemia. The next cause is bone metastases. Other less-frequent causes are milk-alkali syndrome, sarcoidosis (not tuberculosis) and multiple myeloma.

29. About the investigations for clinically-suspected hyperparathyroidism, all the following statements are true, except:

- A. High serum calcium is present in patients with primary hyperparathyroidism.
- B. Estimating PTH is necessary for the diagnosis of hyperparathyroidism.
- C. Estimating serum calcitonin is necessary for diagnosis.
- D. Ultrasound scan is used for localization of the adenoma.
- E. Sestamibi scan is used for localization of the adenoma.

C. Serum calcitonin level is not needed for the diagnosis of hyperparathyroidism.

The combination of high serum calcium and high PTH are enough to diagnose hyperparathyroidism, even in the absence of clinical manifestations.

A combination of neck ultrasound and parathyroid isotope (sestamibi) scan are very reliable in preoperatively localizing the site of the adenoma. Other localization studies may be needed for recurrent cases. These include CT, MRI and selective venous sampling. However, the most accurate localization method of hyperactive parathyroid glands is by surgical exploration of the neck.

30. About post-thyroidectomy hypoparathyroidism, all the following statements are true, except:

- A. It may be caused by inadvertent removal of the parathyroid glands at thyroidectomy.
- B. It may be caused by devascularization of the parathyroid glands at operation.
- C. The condition usually presents about two weeks after thyroidectomy.
- D. The earliest symptom is facial and peripheral numbness.
- E. Tetany may be manifest or latent.

C. The commonest cause of hypoparathyroidism is removal or devascularization of the parathyroid glands at thyroidectomy. If a parathyroid gland is inadvertently removed, it should

be immediately cut into 1mm pieces and implanted in a pocket that is made in the sternomastoid muscle.

The old teaching of thyroidectomy recommended that the inferior thyroid arteries are to be ligated away from the thyroid gland in order to avoid injury of the recurrent laryngeal nerves. We now realize that this technique exposes the parathyroids to ischaemia because the inferior thyroid artery is usually the main blood supply of the parathyroids. The modern recommendation is to ligate and divide the tertiary branches of the artery just on the surface of the thyroid, i.e., after the take off of the parathyroid branches.

The condition usually presents between days 2-5 after the operation, and sometimes earlier. The earliest symptom of hypocalcaemia is circumoral and peripheral numbness. Latent tetany can be revealed by inflating the sphygmomanometer cuff around the arm (Trousseau's sign). This stage should be treated with oral calcium and vitamin D3.

If left untreated the patient develops tetany in the form of carpal pedal spasm; a condition that requires the addition of IV calcium.

31. About anatomy of the adrenal glands, all the following statements are true, except:

- The right adrenal gland is closely related to the inferior vena cava.
- The right adrenal vein ends in the inferior vena cava.
- The left adrenal vein ends in the left renal vein.
- The left adrenal vein is shorter than the right vein.
- The middle adrenal artery is a branch of the abdominal aorta.

D. The right adrenal vein is very short (about 5mm) and ends in the inferior vena cava. The right vein is, therefore, difficult to ligate and divide, and is easily avulsed from the cava which makes right adrenalectomy more serious than the left.

32. About physiology of the adrenal gland, all the following statements are true, except:

- Aldosterone is secreted by the zona glomerulosa of the adrenal cortex.
- Aldosterone secretion is under control of the rennin-angiotensin system.
- A high serum cortisol level inhibits the secretion of ACTH from the anterior pituitary.
- The adrenal medulla is under control by the anterior pituitary gland.
- The adrenal medulla secretes adrenaline and noradrenaline.

D. The adrenal medulla is controlled by the sympathetic nervous system.

33. About Conn's syndrome, all the following statements are true, except:

- The syndrome is caused by an aldosterone-secreting tumour of the adrenal cortex.
- Hypertension is the main feature of the syndrome.
- Hyperkalaemia is a feature of the syndrome.
- CT and MRI are the imaging studies of choice for tumour localization.
- Adrenalectomy is the main line of treatment.

C. Conn's syndrome is primary hyperaldosteronism. The high aldosterone level causes sodium and water retention (hypertension) and renal loss of potassium (hypokalaemia).

34. A 53 year old man is accidentally discovered to have a well-defined 2.5cm right adrenal mass on CT scan that is done for some other reason. Hormonal studies are all normal. The proper management is:

- A. FNAC.
- B. Adrenalectomy.
- C. Radiological follow-up.
- D. Radiotherapy.
- E. Radiographically-guided embolization of the feeding arteries.

C. The incidentally-discovered asymptomatic non-functioning adrenal mass is called "adrenal incidentaloma". An incidentaloma that is bigger than 4cm carries a risk of being malignant. A smaller mass requires radiological follow-up. Any evidence of tumour enlargement or invasion is an indication for adrenalectomy.

35. What statement is true of pheochromocytoma?

- A. It is a neuroendocrine tumour of the adrenal cortex.
- B. It is associated with MEN I.
- C. It is malignant in 90% of cases.
- D. Extra-adrenal pheochromocytomas account for about 10% of cases.
- E. It is bilateral in 90% of cases.

D. Pheochromocytoma may be isolated or may exist as a part of MEN II. Pheochromocytoma is known as the disease of 10%:

- 10% malignant
- 10% bilateral
- 10% in children
- 10% extra-adrenal. The commonest extra-adrenal site is the sympathetic chain.

36. For the pre and intraoperative preparation of a pheochromocytoma patient, all the following are used, except:

- A. Alpha adrenergic blockers.
- B. Beta adrenergic blockers.
- C. Correction of deficient blood volume.
- D. Correction of hypokalaemia.
- E. Insertion of arterial cannula for intra-operative monitoring.

D. Pheochromocytoma is a pharmacological bomb. It may suddenly release large amounts of catecholamines that cause severe hypertension, sweating and tachycardia. This is likely to occur during adrenalectomy. Another complication of adrenalectomy for pheochromocytoma is sudden hypotension because of the contracted blood volume. Meticulous pre and intraoperative preparations can lessen these two complications.

It is essential to give an alpha-adrenergic blocker like dibenzyline in increasing doses for 7-10 days preoperatively until orthostatic hypotension occurs. A beta-adrenergic blocker may be given after alpha blockade, for 3-4 days preoperatively to avoid arrhythmias and severe tachycardia.

37. About Cushing's syndrome, all the following statements are true, except:

- A. Cushing's disease is caused by an anterior pituitary adenoma.
- B. With adrenal Cushing's syndrome ACTH level is elevated.
- C. Truncal obesity is one of the manifestations of the syndrome.
- D. These patients tend to be hypertensive.
- E. These patients are prone to develop diabetes mellitus.

Pituitary Cushing's syndrome (Cushing's disease) is caused by an adenoma of the anterior pituitary that produces excess ACTH. It is the most frequent cause of the syndrome. The high ACTH level produces bilateral adrenal cortical hyperplasia and overproduction of cortisol. Adrenal Cushing's syndrome is the next frequent cause. It is usually the result of a hyperfunctioning adenoma, and rarely a carcinoma of the adrenal cortex. A high cortisol level causes inhibition of ACTH.

Cortisol is a glucocorticoid that causes diabetes. It also has a mineralocorticoid effect that causes hypertension.

38. The risks of adrenalectomy for Cushing's syndrome are increased by all the following, except:

- A. Hypertension.
- B. Diabetes mellitus.
- C. Delayed wound healing.
- D. Tendency to gastro-duodenal ulceration.
- E. Bronchospasm.

An elevated level of cortisol impairs wound healing and predisposes to gastro-duodenal peptic ulceration.

Bronchospasm is a feature of carcinoid syndrome, not Cushing's syndrome.

Choose the single best answer

1. About anatomy of the parotid gland, all the following statements are true, except:

- A. The parotid gland is wrapped around the ramus of the mandible.
- B. The ramus of the mandible divides the parotid into two surgical parts, superficial and deep.
- C. The parotid duct opens into the vestibule of mouth opposite the upper second molar tooth.
- D. The external carotid artery divides within the gland substance into the maxillary and superficial temporal arteries.
- E. The parotid lymph nodes lie within the gland, deep to the parotid fascia.

B. The facial nerve and its branches divide the parotid gland into its surgical parts, the superficial and deep parts. For this reason, superficial parotidectomy means removal of the parotid gland part that lies superficial to the facial nerve and its branches.

2. About anatomy of the submandibular salivary gland, all the following statements are true, except:

- A. The mylohyoid muscle divides the gland into superficial and deep parts.
- B. The submandibular duct arises from the superficial part of the gland.
- C. The deep part of the gland is related to the hypoglossal nerve.
- D. The submandibular duct is closely related to the lingual nerve.
- E. The facial artery is related to the posterior aspect of the gland.

B. The duct arises from the deep part of the gland.

The lingual and hypoglossal nerves are related to the deep aspect of the submandibular gland.

The lingual nerve has an intimate relation with the duct; at first the nerve is superficial to the duct, then passes below it, and finally ascends deep to the duct to supply the tongue.

The facial artery is also closely related to the submandibular gland. At first it grooves the posterior aspect of the gland, and then passes on its lateral surface, and finally ascends over the mandible to supply the face.

3. The commonest discrete lump of the parotid gland is:

- A. Pleomorphic adenoma.
- B. Mucoepidermoid carcinoma.
- C. Mumps.
- D. Parotid gland stone.
- E. Tuberculosis of the parotid lymph node.

A. Pleomorphic adenoma is the commonest discrete lump of the parotid. It is also the commonest salivary neoplasm.

Mucoepidermoid carcinoma is the commonest malignancy. It has different grades of malignancy and can affect children.

Mumps is a viral disease that is diminishing in incidence because of compulsory immunization.

Both parotid glands are diffusely enlarged. The disease does not present as a discrete lump.

Stones are more prevalent in the submandibular than in the parotid gland. In either case the gland stone is not palpable. A duct stone, however, can be felt through the mouth. Tuberculosis of this node is a rarity.

4. About submandibular salivary stones, all the following statements are true, except:

- The majority are radio-opaque.
- A stone can be detected by CT scan.
- A stone may present by a submandibular swelling that increases in size by eating.
- A submandibular salivary swelling can be rolled over the angle of the mandible.
- A stone in the gland is treated by submandibular sialadenectomy.

D. 80% of submandibular stones are radio-opaque because they contain calcium. The stone may be present in the gland or in the duct.

The stone usually presents by a painful submandibular swelling while eating. Pain and swelling ease over one to two hours after a meal. A submandibular salivary swelling is characterized by two features; first it is present in the submandibular region, and second it cannot be rolled over the lower border of the mandible. The latter is in contrast to a submandibular lymph node swelling. A calculus may also cause acute or recurrent attacks of sialadenitis. A duct stone can be felt in the floor of the mouth; under the tongue.

A gland stone is treated by submandibular sialadenectomy. A duct stone that can be felt in the floor of the mouth can be removed from the mouth cavity without removal of the gland.

5. About bacterial parotitis, all the following statements are true, except:

- Parotitis is known to be more prevalent in the postoperative period.
- The usual bacteria are *Staphylococcus aureus* and anaerobes.
- A parotid abscess causes severe pain.
- Clindamycin is a suitable antibiotic to be used before the formation of pus.
- Incision and drainage of a parotid abscess should await the detection of fluctuation.

E. Poor mouth hygiene and dehydration contribute to the development of postoperative parotitis.

Parotid abscess pain is severe because the swollen gland lies within the tight confines of the tough parotid fascia.

Clindamycin is a suitable antibiotic that is used to abort infection before the formation of an abscess because it is effective against *Staphylococci* and anaerobes.

Once an abscess has formed the treatment is incision and drainage. Because the gland is covered by tough fascia, the formation of an abscess does not produce fluctuation. Abscess formation is diagnosed by other indicators, e.g., throbbing pain, hectic fever, oedema, failure to respond to antibiotics for 48 hours and by Ultrasonography.

6. A 10-year old boy presents by progressive enlargement of a right parotid swelling over the last 10 months. Lately the boy is unable to close his right eye. Examination shows right facial nerve palsy. The most likely diagnosis is:

- Adenolymphoma.
- Metastasis in parotid lymph node.

- C. Adenocarcinoma.
- D. Adenoid cystic carcinoma.
- E. Mucoepidermoid carcinoma.

E. A parotid swelling with facial nerve palsy means a malignant tumour.

Adenolymphoma is a benign tumour.

The commonest malignancy of the parotid is the mucoepidermoid type. Three grades are described; low, intermediate, and high-grade tumours. The low-grade type is the most frequent and is known to affect children.

Adenoid cystic carcinoma is the next common salivary malignancy. It is more prevalent in the minor salivary glands.

7. The possible complications of submandibular sialadenectomy include all the following, except:

- A. Wound haematoma.
- B. Deviation of the tongue to the operation side when protruded.
- C. Drooping of the angle of the mouth on the side of surgery.
- D. Inability to close the eyelids on the side of the operation.
- E. Loss of somatic and taste sensations on one half of anterior two thirds of the tongue.

D. The anterior facial vein and the facial artery have to be ligated and divided in order to perform submandibular sialadenectomy. A slipped ligature can cause a big haematoma.

The incision for this operation should be placed at least 2cm from the lower border of the mandible in order to avoid injury of the mandibular branch of facial nerve. This nerve descends in the neck then loops up to supply muscles at the angle of the mandible. The zygomatic branch of the facial nerve controls closure of the eyelids and is too far away from the incision to be injured. The hypoglossal nerve (12th cranial) lies deep to the deep part of the gland. Its injury causes paralysis of the ipsilateral half of the tongue. When the tongue is protruded it deviates to the side of the operation.

The lingual nerve is also related to the deep part of the gland, and more so to its duct. Its injury results in loss of taste and somatic sensations on the ipsilateral half of the anterior 2/3 of the tongue and adjacent gingiva. The patient complains of numbness and frequent drooling and biting of the side of the tongue.

8. About pleomorphic adenoma of the parotid gland, all the following statements are true, except:

- A. It has epithelial and mesenchymal components.
- B. The tumour is painless.
- C. It has an incomplete capsule.
- D. The tumour is usually present deep to the facial nerve.
- E. It may turn malignant.

D. The name of pleomorphic adenoma is based on its heterogenicity because it has epithelial, myoepithelial, myxomatous and cartilaginous elements.

Fortunately a pleomorphic adenoma is usually present in the part of the parotid that is superficial to the facial nerve. This allows its removal while preserving the nerve. Though benign, the capsule is incomplete and allows extension of the neoplasm into the surrounding tissues. This is why enucleation of the tumour can be followed by recurrence. The tumour, therefore, has to be removed with a safety margin. This usually necessitates removal of the whole part of the gland that is superficial to the facial nerve. The operation is called superficial parotidectomy. Long-standing pleomorphic adenomas can turn into adenocarcinoma.

9. About adenolymphoma, all the following statements are true, except:
- A. The tumour is related to smoking.
 - B. It may be bilateral.
 - C. It has epithelial and lymphoid components.
 - D. The tumour is cystic.
 - E. Facial nerve palsy is characteristic of this tumour.

E. Adenolymphoma is bilateral in 10% of cases.

This is a benign tumour that does not invade the facial nerve.

10. All the following are possible complications of parotidectomy, except:
- A. Loss of sensation on one side of the face.
 - B. Inability to close the eyelids.
 - C. Salivary fistula.
 - D. Sweating on the side of the face when eating (gustatory sweating).
 - E. Immobility of one angle of the mouth when the patient smiles.

A. Parotidectomy may be complicated by facial nerve injury, particularly when done for a malignant tumour. This does not affect facial sensation, as this is conducted by the trigeminal nerve. The facial is a purely motor nerve. Paralysis of the facial nerve affects closure of the eyelids, movements of the lips and muscles of facial expression.

Frey's syndrome is gustatory sweating. This means that after parotidectomy there is possibly damage of the local autonomic fibres with later cross regeneration between the fibres that stimulate salivary secretion and those that stimulate sweating. With the smell or taste of food, there is flushing and sweating of the skin of the parotid region.

11. A baby is born with a left posterior triangle swelling. The swelling is subcutaneous, partially compressible and translucent. The clinical diagnosis is:

- A. Sternomastoid tumour.
- B. Branchial cyst.
- C. Haemangioma.
- D. Dermoid cyst.
- E. Cystic hygroma.

E. A cystic hygroma is a lymphatic malformation that results in cystic spaces that intercommunicate. Partial compressibility is due to displacement of fluid into the deeper spaces of the lesion. The swelling is soft and is characteristically translucent.

12. About Ludwig's angina, all the following statements are true, except:

- This is tuberculous infection of the deep neck spaces.
- Diabetics are more prone to develop this condition.
- It causes laryngeal oedema.
- Oedema of the floor of mouth pushes the tongue upwards.
- Urgent incision and drainage is needed.

A. Ludwig's angina is caused by deep cellulitis/ abscess around the submandibular gland usually due to streptococcal infection.

It causes stridor and, therefore, urgent incision and drainage under general anaesthesia is indicated. This is also supplemented by IV antibiotics.

13. A patient is diagnosed to have malignant metastasis in right upper deep cervical lymph nodes. There are no symptoms to indicate the site of the primary. The possible primary lesion may be any of the following, except:

- Nasopharyngeal carcinoma.
- Carcinoma of maxillary antrum.
- Papillary carcinoma of thyroid.
- Carcinoma of pyriform fossa of hypopharynx.
- Laryngeal carcinoma.

E. Carcinoma of the larynx presents by causing hoarseness of voice. The others are called occult malignancies as they may remain silent until the cervical nodes are enlarged due to malignant deposits.

14. The commonest swellings in the carotid triangle are:

- Thyroid nodules.
- Lymphadenopathy.
- Carotid body tumour.
- Branchial cyst.
- Lipoma.

B. By far, the commonest neck swellings are caused by lymphadenopathy.

15. About cold abscess of the neck, all the following statements are true, except:

- It is usually caused by caseation of tuberculous lymphadenitis.
- The abscess may have two components; one superficial, and one deep to the deep fascia.
- The condition is mildly painful with low-grade fever.
- Anti-tuberculous treatment is an essential part of treatment.
- Drainage is achieved by incision.

E. Incision of a cold abscess is likely to result in sinus formation. Drainage by repeated aspiration is the rule. An incision is required only in case of secondary pyogenic infection.

16. About branchial cyst and fistula, all the following statements are true, except:

- A branchial cyst is observed in the neonate.
- A branchial fistula is present at birth.
- A branchial cyst is partially covered by the sternomastoid muscle.
- The main differential diagnosis of branchial cyst is cold abscess.
- A branchial cyst contains cholesterol crystals.

A. Though congenital, a branchial cyst does not appear at birth. It presents in childhood or adolescence.

On the other hand, a branchial fistula is always present since birth. It may be bilateral. Its pin-point opening is present at the anterior border of the lower third of the sternomastoid.

17. The classic complete neck dissection for cervical lymph node metastases includes removal of all the following, except:

- Excision of the anterior and posterior triangle nodes on one side.
- The internal jugular vein.
- The common carotid artery.
- The sternomastoid muscle.
- The submandibular salivary gland.

C. Removal of the common carotid artery causes cerebral stroke.

18. Do not wait for fluctuation of an abscess to drain it in all the following positions, except:

- Distal pulp space infection of a finger.
- Parotid abscess.
- Subcutaneous abscess of forearm.
- Perinephric abscess.
- Perianal abscess.

C. The general principle is to drain infection when we are sure that it has formed an abscess. This is classically indicated by fluctuation (though it is very painful to elicit). In certain situations, however, we should not wait for fluctuation:

- Deep abscess that are situated too far from the surface to feel. Example is a perinephric abscess or any intra-abdominal abscess.
- Parotid abscess as it is covered by tough fascia.
- Infections where waiting invites complications. Examples are distal pulp space infection, where necrosis of distal phalanx can occur, and perianal abscess where an anal fistula is liable to occur.
- Abscess in very soft tissues that may normally give the impression of fluctuation. Examples are breast abscess and gluteal abscess.

There are other indicators for an abscess formation. These include:

- Throbbing pain.
- Hectic fever.
- Local oedema.
- Failure to respond to antibiotics.
- Ultrasonography.

19. A 72-year-old man presents with dysphagia for the last 3 years. There is an intermittently appearing gurgling lump on the left side of his neck. He sometimes regurgitates food during eating. The clinical diagnosis is:

- A. Carcinoma of the cervical part of esophagus.
- B. Foreign body in the esophagus.
- C. Plummer-Vinson syndrome.
- D. Pharyngeal diverticulum.
- E. Carcinoma of pyriform fossa of hypopharynx.

D. Pharyngeal (Zenker's) diverticulum is a mucosal outpouching through the potential space between the thyropharyngeus and cricopharyngeus parts of the inferior constrictor muscle of the pharynx. The majority of these diverticula are present on the left side of the neck.

20. About thoracic outlet syndrome, all the following statements are true, except:

- A. In all cases a cervical rib is present.
- B. The commonest manifestations are caused by compression of the lower trunk of the brachial plexus.
- C. There may be hyposthesia of medial side of forearm.
- D. It is one cause of Raynaud's phenomenon.
- E. There may be chronic heaviness and oedema of the upper limb.

A. A cervical rib is one cause of thoracic outlet syndrome. The syndrome may be caused by a fibrous band, by tight scalene muscles or by post-fixation of the brachial plexus.

21. The treatment of a 2cm malignant ulcer on the left side of the anterior part of the tongue with no palpable neck lymph nodes is:

- A. Combination chemotherapy alone.
- B. Neoadjuvant chemotherapy then wide surgical excision of the tumour.
- C. Excision of the tumour with a safety margin.
- D. Excision of the tumour with a safety margin and bilateral block neck dissection.
- E. Excision of the tumour with a safety margin and left block neck dissection.

E. This is a squamous cell carcinoma. Wide surgical excision with a safety margin and radiotherapy are effective methods of treatment. Because of the high possibility of lymph node metastases, block neck dissection is done even when the lymph nodes are not palpable (prophylactic neck dissection). For cancers of the anterior two thirds lymphatic spread occurs to the ipsilateral neck nodes. Cancers of the posterior third spread to the upper deep cervical nodes on both sides of the neck.

22. About carotid body tumour, all the following statements are true, except:

- A. It is a chemodectoma.
- B. It presents by a mass in the carotid triangle.
- C. The mass is pulsatile.
- D. The majority are benign.
- E. Biopsy is needed before excision.

E. The tumour arises from chemoreceptors that are present at the carotid bifurcation. It is, therefore, a chemodectoma. The great majority are benign. Biopsy, even FNA, is contraindicated because of its high vascularity.

23. About carcinoma of the lip, all the following statements are true, except:

- A. The majority arise on the lower lip.
- B. Its development is related to prolonged sun exposure.
- C. This is a squamous cell carcinoma.
- D. Prognosis is better than that of carcinoma of the posterior third of the tongue.
- E. In the absence of lymph node spread, prophylactic neck dissection is indicated.

E. Carcinoma of the lip has a better prognosis than that of the tongue. The worst prognosis is that of the posterior third of the tongue. The lower prevalence of lymphatic spread of lip cancer than tongue cancer allows for follow-up only of clinically-negative neck nodes. When these nodes become involved they are removed either by classic block neck dissection or by a supra-hyoid dissection only.

24. About cleft lip and palate, all the following statements are true, except:

- A. They are commonly associated with other congenital anomalies.
- B. Cleft palate causes feeding difficulties for the baby.
- C. Otitis media commonly affects babies with cleft palate.
- D. The main problem with isolated cleft lip is cosmetic.
- E. The ideal age for cleft palate repair is 4-6 years.

E. Cleft lip repair is done between 3 and 6 months of age. Cleft palate repair is done between 6 and 18 months.

25. About tracheostomy, all the following statements are true, except:

- A. Tracheostomy is indicated if mechanical ventilation is needed for a long time.
- B. Emergency tracheostomy is done at the scene of an accident if there is upper airway obstruction.
- C. Percutaneous tracheostomy is suitable for critically-ill ICU patients.
- D. In adults, an ellipse is removed from the anterior wall of 2nd, 3rd and 4th tracheal rings.
- E. One of its possible complications is subglottic stenosis.

B. Prolonged oro-tracheal intubation exposes the patient to the risk of subglottic and upper tracheal stenosis. If mechanical ventilation is needed beyond two weeks the endotracheal tube is replaced with a tracheostomy.

Tracheostomy is not quite an emergency operation that is to be done at the scene of an accident, nor in a hurry in the emergency room. For extreme emergencies there are faster and simpler alternatives, which are endotracheal intubation or crico-thyroidotomy.

Subglottic stenosis occurs if the tracheal incision involves the first tracheal ring.

Choose the single best answer

1. All the following statements about the oesophageal hiatus of the diaphragm are true, except:

- A. It is present at the level of the 10th thoracic vertebra.
- B. It allows the passage of the vagus nerves from the chest to the abdomen.
- C. A sliding hiatus hernia passes through it.
- D. A para-oesophageal hiatus hernia passes through it.
- E. A Bochdalek hernia passes through it.

E. Bochdalek hernia is a congenital disorder. The defect is present between the costal and the vertebral origins of the diaphragm. It is usually present on the left side. When large, it manifests at birth by causing neonatal respiratory distress. When small it may not appear at birth, but presents at a later date in life, possibly in adulthood.

2. The antireflux mechanisms at the lower oesophagus include all the following except:

- A. A high pressure zone in the lower oesophagus.
- B. Thickened circular muscle layer in lower oesophagus that makes a sphincter.
- C. The presence of part of the oesophagus inside the abdomen.
- D. Diaphragmatic crura that are snugly fitting around the oesophagus.
- E. The acute angle between the fundus of stomach and the left side of oesophagus (angle of His).

B. There is no anatomical sphincter in the lower oesophagus, i.e., the circular muscles are not thickened, but there is a sort of physiological sphincter. Manometric studies show that there is a short segment in the lower oesophagus where the pressure is relatively high; the high-pressure zone. The intraabdominal segment of the oesophagus is subjected to the positive intraabdominal pressure that collapses it. A snugly fitting diaphragmatic crura and an acute angle of 100° are additional anti-reflux factors.

3. All the following statements are true, except:

- A. The epithelium of the lower third of oesophagus is columnar.
- B. The oesophagus is about 25cm in length.
- C. The intra-abdominal part of the oesophagus is about 4cm in length.
- D. The lower oesophagus is a site for porta-systemic venous anastomosis.
- E. The cricopharyngeus muscle forms the upper oesophageal sphincter.

A. The oesophagus is lined by non-keratinized stratified squamous epithelium. At the cardia, it changes to columnar epithelium. The squamocolumnar junction is seen by the endoscopists who call it the z-line. It roughly corresponds to the oesophagogastric junction. At the z-line, the pink oesophageal mucosa changes to the red appearance of the gastric columnar epithelium. If columnar epithelium spreads above the level of the cardia, it is called Barrett's oesophagus. The condition is caused by gastro-oesophageal reflux disease and is pre-cancerous.

4. The commonest form of trachea-oesophageal anomalies is:
- Oesophageal atresia without connection to the trachea.
 - Oesophageal atresia with a fistula connecting the trachea to the oesophagus distal to the atretic segment.
 - Oesophageal atresia with a fistula connecting the trachea to the oesophagus proximal to the atretic segment.
 - Tracheo-oesophageal fistula without oesophageal atresia.
 - Tracheal atresia without a trachea-oesophageal fistula.

B. The commonest anomaly is proximal blind atresia with distal tracheo-oesophageal fistula (87%). As a result of proximal oesophageal atresia, the saliva and milk (if the baby was fed) will fill the upper pouch then trickle into the trachea and mouth causing bronchopneumonia and frothy saliva. A nasogastric tube cannot be pushed down to the stomach. It stops at mid-oesophagus at its blind end. Meanwhile, the stomach is filled with air because air passes through the fistula from the trachea to the distal part of oesophagus, and then to the stomach.

5. All the following statements about congenital diaphragmatic hernia (Bochdalek type) are true, except:

- More frequently occurring than the anterior type (Morgagni type).
- It occurs more frequently on the left side.
- Symptoms are caused by acid reflux.
- Plain X-ray of the chest is usually diagnostic.
- The stomach, intestine and spleen may prolapse in the chest cavity.

C. Posterior type of congenital diaphragmatic hernia (Bochdalek hernia) constitutes 90% of cases (left side more than right, Lt:Rt = 5:1). The defect lies between the costal and the vertebral parts of the diaphragm.

Bochdalek hernia causes neonatal respiratory distress. If the hernia is small it can present at a later date in life.

A chest X-ray reveals gastric and intestinal gas in the thorax.

6. A 70-year-old man develops increasing dysphagia over six months. Within this period his weight went down from 82kg to 60kg. The most likely cause is:

- Achalasia of the cardia.
- Carcinoma of the esophagus.
- Sliding hiatal hernia.
- Paraesophageal hernia.
- Oesophageal diverticulum.

B. Progressive dysphagia is suggestive of malignancy. If the marked weight loss and age are also considered it becomes highly suspicious. The definitive diagnosis, however, rests on endoscopic biopsy.

7. A 30-year-old man gives a two-year history of heartburn and choking attacks during sleep. Recently he has been complaining of dysphagia that he localized deep to lower sternum. The most likely diagnosis is:

- Carcinoma of the esophagus.
- Angina pectoris.
- Benign peptic stricture of the esophagus.
- Achalasia of the cardia.
- Mallory Weiss syndrome.

C. Symptoms are typical of benign peptic stricture of the oesophagus that is caused by gastro-oesophageal reflux disease.

A less likely diagnosis is the development of adenocarcinoma on top of Barrett's oesophagus. This complication, however, usually takes a longer time of reflux to develop.

Achalasia of the cardia begins with dysphagia. When the oesophagus dilates and fills up with fluid, the patient may start to have choking attacks during sleep.

Mallory Weiss syndrome is an acute tear in lower oesophagus due to uncoordinated severe vomiting. It presents by haematemesis.

8. About para-oesophageal hiatus hernias, one statement only is true:

- They make 85% of hernias through the oesophageal hiatus of the diaphragm.
- The oesophagogastric junction lies above the level of the diaphragm.
- The main symptom is heartburn.
- They may be complicated by gastric volvulus.
- The main line of treatment is conservative by diet regulation and by proton pump inhibitors.

D. Para-oesophageal (rolling) hiatus hernias are usually space-occupying large lesions. These hernias are prone to cause gastric volvulus with consequent bleeding and possible gangrene of the stomach. They contain hernia sacs and should be treated like external hernias, with surgery. The other statements apply to the sliding variety.

9. The complications of GERD include all the following, except:

- Iron deficiency anaemia.
- Repeated chest infections.
- Oesophageal stricture.
- Severe Haematemesis.
- Columnar-lined oesophagus.

D. Reflux oesophagitis does not cause severe bleeding. Blood loss from peptic ulcers is slow and can cause iron-deficiency anaemias.

10. One of the following is not needed for the diagnosis of gastro-oesophageal reflux disease:

- Contrast oesophagography.
- CT scan.
- Upper GI endoscopy.

- D. Oesophageal manometry.
- E. 24-hour pH monitoring.

B. CT scan is of no value in the diagnosis of this condition. The other tests are useful.

- Contrast radiography demonstrates reflux of the contrast material from the stomach to the oesophagus when the patient is placed in a Trendelenburg's position. It also shows a sliding hernia, if present.
- Endoscopy documents and stages the severity of oesophagitis. It allows biopsy of areas that are suspected to be malignant or pre-malignant (Barrett's oesophagus).
- Manometry documents a weak oesophageal sphincter.
- 24-hour pH monitoring is the most reliable test for diagnosis of gastro-oesophageal reflux disease. It shows that pH in the oesophagus remains acidic for periods that are long enough to cause the pathology and symptoms.

11. Regarding gastro-oesophageal reflux disease, all the following are true, except

- A. A sliding oesophageal hiatus hernia is the usual cause.
- B. A change of the lower oesophageal epithelium is one of its possible complications.
- C. Oesophageal peptic ulcer is one of its possible complications.
- D. May cause chest pain.
- E. Initial treatment is surgical.

E. In the majority of cases the symptoms can be controlled by conservative measures, mainly diet regulation, weight reduction and proton pump inhibitors. Only a minority of patients will receive surgical treatment. The indications are:

- Failure of proper medical treatment to control the symptoms or repeated recurrences after such adequate treatment.
- Presence of complications as severe oesophagitis, persistent anaemia, oesophageal ulcer or stricture of the oesophagus.

12. About Nissen fundoplication, all the following statements are true, except:

- A. It restores the intra-abdominal part of the oesophagus.
- B. It reconstructs the oesophageal hiatus.
- C. The muscle fibres in the lower oesophagus are longitudinally divided.
- D. The acute angle of His is accentuated.
- E. The operation can be done by the laparoscopic approach.

C. Longitudinal division of the muscle fibres of the lower oesophagus is the treatment of achalasia of the cardia. It is called Heller's cardiomyotomy.

Nissen fundoplication entails:

- Bringing the cardia down in the abdomen, thus restoring the abdominal part of oesophagus.
- Restoring the widened oesophageal hiatus to a normal size.
- Wrapping the fundus of the stomach around the lower oesophagus accentuates the acute angle of His.
- The majority of Nissen fundoplications are done by the laparoscopic approach.

13. The possible complications of anti-reflux surgery for GERD include all the following, except:

- A. Recurrent reflux.
- B. Gas bloat syndrome.
- C. Dysphagia.
- D. Dumping syndrome.
- E. Pneumothorax.

D. Dysphagia and gaseous distension with flatulence are frequently seen after anti-reflux operations. They are usually self-limiting within a few months. Persistent dysphagia requires endoscopic dilatation, or even, reoperation.

Pneumothorax is the result of pleural injury while dissecting the lower thoracic part of oesophagus.

Dumping syndrome occurs after gastric surgery, where the pyloric sphincter is removed (as in gastrectomy), destroyed (as in pyloroplasty) or bypassed (as in gastro-jejunostomy).

14. About achalasia of the cardia, one statement only is true:

- A. The usual clinical presentation is chest pain.
- B. Symptoms are usually progressive.
- C. Manometry shows defective relaxation of lower esophageal sphincter.
- D. Endoscopic dilatation gives better results than surgery.
- E. Surgery necessitates excision of the cardia.

C. The main pathology in achalasia is failure of relaxation of the lower oesophageal sphincter. It is best demonstrated by oesophageal manometry. Dysphagia is the main symptom and it classically has an intermittent course. The ideal treatment is cardiomyotomy, where the spastic muscles are longitudinally split, exposing the mucosa of the lower 7cm of the oesophagus and the upper 2cm of the stomach.

15. One statement only about the clinical features of achalasia of the cardia is true:

- A. It usually affects people in the 7th and 8th decades of life.
- B. Dysphagia is painless.
- C. Dysphagia is progressive.
- D. Classically, solid food is more difficult to swallow than fluids.
- E. Patients are commonly malnourished.

B. The disease occurs more often in the second to the fourth decades of life. The main symptom is long-standing, intermittent, painless dysphagia which may be more to fluids than solids. Because of the intermittent course of the disease patients are usually fairly nourished. This is in contrast to oesophageal cancer patients whose dysphagia is progressive and more to solids. The results are loss of weight and malnutrition.

16. A patient has dysphagia that is caused by an advanced squamous cell carcinoma of the middle third of oesophagus. He has pulmonary metastases. The best treatment for dysphagia is:

- Open oesophagectomy.
- Thoracoscopic oesophagectomy.
- Endoscopic placement of a stent.
- Chemotherapy.
- Gastrostomy.

C. Oesophagectomy is a major procedure that has high morbidity and mortality. It is not worth doing as a palliative procedure.

The best treatment is the simplest one. Endoscopic stent placement or laser therapy that opens a way for swallowing through the tumour is the treatment of choice.

Gastrostomy improves nutrition but does not alleviate dysphagia and choking because the patient will still be unable to swallow his saliva.

17. For early carcinoma of the lower third of oesophagus, the best hope for cure is obtained by:

- Oesophagectomy and gastric pull-up.
- Gastrostomy.
- Endoscopic stenting.
- Radiotherapy.
- Chemotherapy.

A. As long as there are no metastases and the patient is in a fair general condition, the best hope for cure is oesophagectomy. If the tumour is very low at or near the cardia, the upper part of the stomach is also resected. The best way to reconstruct the gut is to pull the stomach up and anastomose it to the upper oesophagus in the neck. This technique has the following advantages:

- It removes almost the whole oesophagus and, thus, eradicates the disease that is known to spread up through the oesophageal wall.*
- Leakage from a neck anastomosis is less serious than that of an intrathoracic anastomosis. The latter causes life-threatening mediastinitis.*

Adjuvant radio and chemotherapy may be useful in selected cases.

18. In one of the following tumours radiotherapy (offered as a 1st line treatment) has the same results as surgical resection:

- Exocrine carcinoma of the pancreas.
- Carcinoma on top of Barrett's oesophagus.
- Squamous cell carcinoma of the skin.
- Hepatocellular carcinoma.
- Renal cell carcinoma.

C. Generally squamous cell carcinoma is more sensitive to radiotherapy than adenocarcinoma. Barrett's oesophagus is adenocarcinoma that arises in the columnar epithelium that replaces the

squamous type as a result of reflux. Its primary treatment is surgical excision, not radiotherapy. In the oesophagus, as a whole, squamous cell carcinoma is the frequent type. It gives better response to radiotherapy.
Pancreatic, liver, gastric and renal cancers are adenocarcinomas.

19. A 20-year old female is brought to hospital immediately after she had tried to commit suicide by ingesting a strongly-alkaline drain-cleaning fluid. One of the following statements is true:

- A. Acid solution should be given to neutralize the alkali effect.
- B. Emetics should be administered.
- C. Immediate oesophageal stenting prevents stricture formation.
- D. Early oral feeding is contraindicated.
- E. Corticosteroid administration is contraindicated.

D. Oral feeding is withheld at this early stage but is resumed after a few days if the patient continues to show favorable improvement. Meanwhile parenteral nutrition is given.

Acid ingestion and induced emesis are contraindicated as they may exacerbate esophageal injury or lead to aspiration.

If the caustic injury is superficial, stricture formation is unlikely to occur. Stricture follows deep oesophageal burns because they heal by granulation tissue formation and later fibrosis. In any case, the oesophageal wall is friable. If endoscopy is to be done, it should be careful and is intended to know the upper limit of the burn. The endoscope should not pass through the injured area in order to avoid perforation. Stent placement is certainly contraindicated.

Corticosteroids are commonly used to reduce the inflammatory process. They are covered by antibiotics.

Endotracheal intubation or tracheostomy may be required if severe upper airway edema is present.

20. About post-corrosive oesophageal stricture, all the following statements are true, except:

- A. Stricture follows healing of a deep burn.
- B. The main symptom is dysphagia.
- C. Endoscopic oesophageal dilatation is effective, but may cause perforation.
- D. Primary treatment is surgical.
- E. Colon bypass is the preferred option when surgery is needed.

D. Primary treatment is by repeated endoscopic dilatation. It is safer than surgery and is highly successful in relieving dysphagia. It is not, however, free of complications; the main one is oesophageal perforation.

21. A 60-year old man presents with haematemesis following a bout of repeated vomiting. Urgent endoscopy revealed a linear mucosal tear in the lower part of the oesophagus. The diagnosis is:

- A. Ruptured oesophageal varices.
- B. Reflux oesophagitis with peptic ulceration.

- C. Barrett's esophagus.
- D. Carcinoma of the esophagus.
- E. Mallory-Weiss tear.

E. Both Mallory Weiss tear and spontaneous rupture of the oesophagus have a common mechanism. They are likely to affect victims of head trauma and the drunken. In both situations there is vomiting and uncoordinated oesophageal motility. The oesophagus fails to relax in front of the forcibly ejected vomitus. Pressure markedly rises in the lower part of the oesophagus, and its wall is stretched. As a result the wall gives way either partially where the mucosa only is split producing severe bleeding (Mallory-Weiss syndrome), or completely through the whole wall thickness (Boerhaave's syndrome). The tear is a longitudinal one in the lower part of the oesophagus.

22. About endoscopic perforation of the oesophagus, all the following statements are true, except:

- A. It is more frequent with endoscopic dilatation than diagnostic oesophagoscopy.
- B. It presents with pain at site of perforation.
- C. It causes mediastinitis and empyema.
- D. Contrast oesophagography is diagnostic.
- E. If a perforation does not spontaneously heal in 48 hours, surgical suturing is indicated.

E. Suturing this tear can be successful if done very early. Delayed sutures fail because they cut through the wall that becomes friable.

Oral intake is stopped and parenteral or gastrostomy feeding is given. Fluid is drained with a chest tube or by neck incision if perforation is high. Antibiotics are administered.

Choose the single best answer

1. About hydrochloric acid secretion, all the following statements are true, except:
- A. Parietal cells are present in the body and fundus of the stomach.
 - B. G cells secrete gastrin in response to gastric wall distension.
 - C. The nerves of Latarjet stimulate hydrochloric acid secretion.
 - D. Calcium stimulates secretion of the hormone gastrin.
 - E. Blocking the proton pump inhibits acid secretion.

C. The nerves of Latarjet are branches of the anterior and posterior vagus nerves. They supply the pyloric antrum and sphincter. They are purely motor nerves that are responsible for gastric evacuation. They have nothing to do with acid secretion.

2. All the following physiological factors are involved in protection of the gastric wall against ulceration, except:

- A. Mucus secretion.
- B. Reflux of alkaline bile from the duodenum.
- C. Bicarbonate secretion
- D. Gastric epithelial regeneration
- E. High blood flow of the stomach.

B. The factors that are involved in protection of the gastric mucosa against digestion by acid and pepsin are collectively called the "gastric mucosal Barrier". The odd one out of the above-mentioned factors is duodenogastric reflux of alkaline secretions. In fact this can cause alkaline gastritis, or even oesophagitis.

3. Congenital hypertrophic pyloric stenosis:

- A. Is more common in female infants.
- B. Most commonly presents in the first two days of life.
- C. Is characterized by bilious vomiting.
- D. Results in metabolic acidosis.
- E. Is diagnosed by ultrasound examination.

E. This condition is most prevalent among the first-born males of a family. Though congenital, projectile vomiting appears 2-3 weeks after birth. Since the obstruction is proximal to the duodenum, vomitus, characteristically, contains no bile.

Loss of hydrochloric acid in the vomitus tends to cause metabolic alkalosis.

The thickened pyloric sphincter is detected by ultrasound examination. It is commonly felt as an olive-like swelling.

4. All the following inhibit the gastric mucosal barrier, except:

- A. Prostaglandin analogues.
- B. H pylori.
- C. Smoking.
- D. Shock.

E. Duodenogastric reflux.

A. Prostaglandins maintain good blood flow to the gastro-duodenal mucosa. They, thus, add to the integrity of the mucosal barrier and are considered cytoprotective. In fact, aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs) are anti-prostaglandins and are known to cause gastroduodenal ulceration.

Shock, of whatever type, is accompanied with reduction of mucosal blood flow.

5. All the following statements about H pylori are true, except:

- A. The prevalence of H pylori infection is inversely related to the hygienic standards of a country.
- B. The bacteria secrete urease enzyme.
- C. The organism inhibits ammonia production.
- D. The organism secretes proteases which destroy mucus.
- E. Eradication therapy for H pylori reduces ulcer recurrence after its treatment.

C. The transmission of H pylori is faeco-oral and, hence, it is inversely related to the hygienic standards.

H pylori organisms secrete urease enzyme, thus releasing ammonia that increases acid secretion. They also secrete proteases, which destroy mucus.

Eradication of this bacterium significantly reduces the recurrence rate following medical treatment. A triple drug therapy consisting of metronidazole, tetracycline or amoxicillin, and bismuth compounds given for 2 weeks gives excellent eradication results in 90% of cases. A proton pump inhibitor is commonly added to this combination.

6. About acute gastric dilatation, one statement only is true:

- A. Acute gastric dilatation is a common postoperative complication.
- B. The stomach exhibits hyperperistalsis.
- C. The condition usually causes hyperkalaemia.
- D. Hypovolaemia is a prominent feature.
- E. Treatment is by gastrectomy.

D. This is a rare condition where the stomach loses its tone and rapidly dilates to reach an enormous size. The stomach becomes filled with air and dark fluid. The source of the fluid is mainly from the intravascular compartment which is depleted and the patient passes into hypovolaemia.

Loss of potassium causes hypokalaemia.

Treatment is always conservative by nasogastric suction and by IV correction of fluid and electrolyte imbalances.

7. All the following conditions predispose to stress ulceration of the stomach, except:

- A. Deep vein thrombosis.
- B. Major burns.
- C. Acute pancreatitis.
- D. Septic shock.

E. Haemorrhagic shock.

A. Stress ulcers are caused by ischaemia of the gastro-duodenal mucosa. Shock, acute pancreatitis and major burns are causes of such ischaemia, but DVT is not.

8. About chronic peptic ulcers, all the following statements are true, except:

- A. The usual sites for a chronic gastric ulcer are the lesser curvature and the pyloric antrum.
- B. The usual site for a chronic duodenal ulcer is the first part of the duodenum.
- C. Hyperacidity is the main underlying cause of a chronic duodenal ulcer.
- D. It is mandatory to biopsy an ulcer in the first part of the duodenum.
- E. A chronic peptic ulcer may be present in the lower oesophagus.

D. Biopsy of a duodenal ulcer is not necessary for diagnosis. Once seen on endoscopy treatment can be started. On the other hand, for a gastric ulcer, seen on endoscopy, multiple biopsies of the ulcer are necessary. Carcinoma of the stomach may be of the ulcerative type. Exclusion of malignancy is required before institution of anti-ulcer therapy.

Gastro-oesophageal reflux of acid causes oesophagitis. If neglected, reflux can cause oesophageal peptic ulcers as well.

9. About complications of chronic gastro-duodenal peptic ulcers, all the following statements are true, except:

- A. Anterior duodenal ulcers tend to perforate.
- B. Posterior duodenal ulcers tend to cause substantial bleeding.
- C. Benign gastric ulcers have a 5% tendency to malignant transformation.
- D. Fibrosis of a chronic duodenal ulcer can cause pyloric obstruction.
- E. The primary treatment of bleeding ulcers is usually non-surgical.

C. Benign gastric ulcers rarely (<1%), if ever, turn malignant.

10. The source of severe bleeding from a posterior duodenal ulcer is:

- A. The portal vein.
- B. The gastro-duodenal artery.
- C. The right gastric artery.
- D. The left gastric vein.
- E. The common hepatic artery.

B. The gastroduodenal artery is a branch of the common hepatic artery. It runs vertically posterior to the first part of the duodenum. A posterior duodenal ulcer may penetrate deep enough to erode this artery and cause severe bleeding. The gastroduodenal artery is, therefore, called the "artery of haemorrhage".

11. If surgery is indicated for a bleeding duodenal ulcer, all the following statements are true, except:

- A. Operation is done under general anaesthesia.

- B. Laparoscopy is the standard approach.
- C. Under-running of the bleeding vessel is the usual method of haemostasis.
- D. A definitive ulcer procedure is usually done after obtaining haemostasis.
- E. If an ulcer-healing procedure is to be done, the standard is truncal vagotomy and pyloroplasty.

B. An inherent disadvantage of laparoscopic surgery is poor haemostatic ability in comparison with open surgery. The continuous flooding of the field with blood impairs visualization. Laparoscopy is suitable for peptic ulcer perforation, but not for bleeding. Another difference between surgery for perforation and that for bleeding is the addition of a definitive procedure for ulcer treatment. For a bleeding ulcer, the distal stomach and first part of duodenum are opened transversely to expose the bleeder which is under-run with sutures. A truncal vagotomy is done. The gastro-duodenal incision is closed vertically to provide wide gastric drainage. The definitive operation is, thus, truncal vagotomy and pyloroplasty. This addition is better avoided in cases of perforation because the patient with peritonitis is less able to stand a long procedure. Furthermore, a vagotomy opens a way for spread of infection to the mediastinum.

12. About vagotomy for the treatment of a chronic duodenal ulcer, all the following statements are true, except:

- A. A truncal vagotomy requires a gastric drainage procedure as gastrojejunostomy.
- B. A truncal vagotomy requires a gastric drainage procedure as pyloroplasty.
- C. A highly selective vagotomy means preservation of the nerves of Latarjet.
- D. Highly selective vagotomy does not require the addition of a gastric drainage procedure.
- E. Truncal vagotomy should be done during emergency surgery for a perforated duodenal ulcer.

E. Truncal vagotomy interrupts both secretory and motor components of the vagi. The resulting gastric stasis requires the addition of a gastric drainage procedure as gastrojejunostomy or pyloroplasty.

A highly selective vagotomy interrupts the secretory component while preserving the motor component of the vagi that is represented by the nerves of Latarjet that supply the pylorus. A gastric drainage procedure, therefore, is not needed with a highly selective vagotomy. Vagotomy is better avoided in cases of perforation because the patient with peritonitis is less able to stand a long procedure. Furthermore, a vagotomy opens a way for spread of infection to the mediastinum.

13. About post-gastrectomy dumping syndrome, all the following statements are true, except:

- A. The condition is caused by rapid transit of gastric content to the jejunum.
- B. The patient develops headache, hypertension, and bradycardia after a meal.
- C. The intake of small meals reduces the intensity of the syndrome.
- D. The intake of dry meals reduces the intensity of the syndrome.
- E. The reduction of sugar intake reduces the intensity of the syndrome.

B. The dumping of hyperosmolar food into the jejunum draws a large volume of water from the extracellular compartment into the intestinal lumen. The results are hypovolaemia (dizziness, tachycardia and hypotension) and increased volume of intestinal contents (colicky abdominal pain, distension, borborygmi and diarrhoea).

The syndrome is usually self-limiting, but this may take many months. Meanwhile the patient is advised to take small meals, to avoid the intake of fluids with the meal (dry meals take a longer time to leave the stomach), and to avoid sugars (to reduce food osmolarity).

14. About perforated duodenal ulcer, all the following statements are true, except

- Causes sudden severe abdominal pain.
- Should be differentiated from acute pancreatitis.
- Usually the abdomen is rigid.
- Air under the diaphragm always shows on plain X-ray.
- Treatment is essentially by urgent surgery.

D. Causes of sudden-onset pain are few. One of them is duodenal ulcer perforation. Other causes include embolism and torsion of an organ.

The differential diagnosis of acute abdominal pain includes perforated duodenal ulcer, acute pancreatitis, acute cholecystitis and biliary colic, acute mesenteric vascular occlusion, ruptured aortic aneurysm and inferior myocardial infarction.

Duodenal ulcer perforation is usually, but not always, accompanied by the presence of air under the diaphragm on a chest X-ray in the erect position.

Treatment is by urgent surgery. The two goals of the operation are sealing the perforation using an omental patch and drainage of the toxic peritoneal fluid.

15. The following statements about pyloric obstruction in adults are all true, except

- Vomiting is characteristically greenish
- Upper GI endoscopy is indicated
- May cause alkalosis
- May cause Hypokalaemia
- May cause tetany

A. As obstruction is proximal to the inlet of bile (duodenal papilla), the vomitus contains no bile. It, therefore exhibits the colour of the ingested food.

Upper GI endoscopy is required to diagnose the cause of obstruction. In adults duodenal ulcer fibrosis is the commonest cause; followed by carcinoma of the pyloric region. Suspected lesions should be biopsied.

Repeated vomiting causes metabolic alkalosis because of loss of hydrochloric acid and also causes hypokalaemia because of potassium loss.

Alkalosis reduces serum ionized calcium and may, thus, cause tetany.

16. About acute upper GI haemorrhage, all the following statements are true, except:

- Bleeding acute gastric erosions is a common cause.
- The initial treatment of acute bleeding varices is shunt surgery.
- A posterior duodenal ulcer can cause bleeding from the gastro-duodenal artery.
- Haematemesis means vomiting of blood.

E. Melena means passage of black tarry stools per rectum.

16. Portal-systemic shunt surgery carries high morbidity and mortality, particularly in the acutely bleeding patient. This is mainly due to the impaired hepatic function in most of these patients. Endoscopic sclerotherapy or banding of the varices is currently the first line treatment that is used to achieve haemostasis. If not initially successful it can be repeated. If, however, repeated endoscopic control is not effective in controlling haemorrhage, urgent surgery will be needed. The safest method for these patients is oesophageal transection and anastomosis with a circular stapler.

17. Regarding Zollinger-Ellison syndrome, all the following statements are true, except:

- A. This is usually caused by a pancreatic tumour.
- B. The syndrome is characterized by marked elevation of the hormone somatostatin.
- C. The syndrome is suspected in patients with recurrent peptic ulceration after adequate treatment.
- D. The syndrome is suspected with peptic ulceration in the extremes of life.
- E. The syndrome is suspected with the discovery of multiple peptic ulcers.

18. Zollinger-Ellison syndrome is caused by hypersecretion of the hormone gastrin. Consequently hydrochloric acid production is markedly elevated and the patient develops recurrent and/or multiple peptic ulcers. Some of these ulcers occur in unusual places. Extremes of age may also be affected.

The majority are caused by a tumour of the pancreas (gastrinoma), which is commonly malignant (60%). Less commonly the syndrome is caused by hyperplasia of the G cells of the antrum.

19. Regarding cancer of the stomach, one statement only is true:

- A. The commonest type is Non-Hodgkin's lymphoma.
- B. Commonest presentation is massive haematemesis.
- C. Lymphatic spread may reach the inferior mesenteric nodes.
- D. The first station for blood spread is the lung.
- E. Whenever possible, surgery is the best treatment.

20. The commonest pathology is adenocarcinoma.

Manifest bleeding is unusual and if it occurs it is of minor amount.

Gastric cancer is a sneaky disease. Initial symptoms are usually vague. These are dyspepsia, early fatigue, anorexia and loss of weight. This is because the stomach is a capacious organ. If, however, the tumour arises in the pyloric or the cardiac end, the patient is alerted at an early stage with the occurrence of vomiting or dysphagia, respectively.

As a foregut organ, the lymphatic drainage of the stomach goes to the coeliac lymph nodes.

Superior mesenteric nodes are rarely involved, but never the inferior mesenteric group of nodes.

A general rule for cancers of the gastrointestinal tract is "resection whenever possible". Radical gastrectomy has the best curative potential for early cases and simple gastrectomy is also the best palliative method for advanced cases.

19. Haematogenous spread of gastric adenocarcinoma goes primarily to the:
- Lungs.
 - Bones.
 - Liver.
 - Brain.
 - Coeliac nodes.

C. Gastric venous drainage is portal, and hence, the first station of blood spread is the liver.

20. All the following increase the risk of gastric cancer, except:
- Main diet of a community is made of smoked food.
 - Infection with *Helicobacter pylori*.
 - Pernicious anaemia.
 - Distal gastrectomy.
 - Prolonged intake of H_2 receptor blockers.

E. There is no evidence that prolonged H_2 blockers intake predisposes to gastric cancer.

21. All the following statements about linitis plastica are true, except:
- It is a lymphoma of the stomach.
 - The stomach is narrowed.
 - The stomach is stiff.
 - The tumour may not be visible on the mucosa.
 - Prognosis is bad.

A. Linitis plastica (leather bottle stomach) is, in fact, a gross description of the diffusely infiltrating type of gastric adenocarcinoma. The wall of the stomach is greatly thickened and indurated while the lumen is greatly reduced. This may occur only in the antrum or may affect the stomach more diffusely. The mucous membrane is intact and the lesion may be missed by endoscopy.

22. The following statements about radical gastrectomy for stomach cancer are all true, except:

- The whole stomach should be removed.
- The left gastric pedicle is ligated and divided at its root.
- The lesser omentum is removed.
- The greater omentum is removed.
- Radical gastrectomy is the treatment of choice for early gastric cancer.

A. Radical surgery is the usual treatment for early solid-tissue cancers if they are discovered at an early stage. The operation is intended for cure (though this is not always its result) as it aims at getting rid of the tumour and all its extensions. It entails excision of the tumour, with a safety margin, together with the draining lymph nodes, all in one block. It is not necessary to excise the whole stomach in all cases. If the tumour is present in the distal part of the organ, removal of a safety margin still allows retaining the proximal part of the stomach, the operation is subtotal radical gastrectomy.

The lesser and greater omenta have to be removed in a radical operation as the draining lymph nodes lie on the lesser and greater curvatures within these omenta. Ligation of the left gastric vessels at their roots is a technical necessity in order to remove the related lymph nodes.

23. The commonest site of gastrointestinal stromal tumours (GIST) is:

- A. Oesophagus.
- B. Stomach.
- C. Duodenum.
- D. Small intestine.
- E. Colon.

B. 40% of GIST tumours affect the stomach, followed by the small intestine (32%).

24. The cells of origin of gastrointestinal stromal tumours (GIST) is:

- A. Parietal cells.
- B. Peptic cells.
- C. Mucus cells.
- D. Cells of Cajal.
- E. G cells.

D. The interstitial cells of Cajal are scattered along the gastrointestinal tract. They act as pacemakers that regulate gut motility.

25. The commonest presentation of gastrointestinal stromal tumours (GIST) of the stomach is:

- A. Epigastric pain.
- B. Anorexia, asthenia and anaemia.
- C. Haematemesis and melaena.
- D. Persistent vomiting.
- E. Epigastric mass.

C. Bleeding is the commonest presentation of GIST.

26. All the following statements about gastrointestinal stromal tumours (GIST) are true, except:

- A. GIST is less frequently occurring than adenocarcinoma.
- B. A high mitotic figure suggests malignancy.
- C. A size that is more than 5cm suggests malignancy.
- D. It arises from the interstitial cells of Cajal.
- E. Main treatment is chemotherapy.

E. GIST may be benign or malignant. The judgment of malignancy depends on two factors:

- High mitotic activity.
- Tumour size > 5cm.

Surgical excision is the main line of treatment.

27. About gastric lymphoma, all the following statements are true, except:

- A. Less frequent than adenocarcinoma.
- B. It is usually of the Hodgkin type.
- C. Prognosis is better than adenocarcinoma.
- D. Whenever possible, surgical excision provides the best results.
- E. Chemotherapy improves the outcome.

B. It is a Non-Hodgkin lymphoma.

28. All the following are pre-requisites for bariatric (weight-reduction) surgery, except:

- A. Body mass index (BMI) > 40.
- B. Body mass index (BMI) > 35 if accompanied with a comorbidity of obesity.
- C. Previous supervised attempts at weight reduction.
- D. Exclusion of Cushing's syndrome as a cause of obesity.
- E. Age not more than 40 years.

E. Proper selection of patients is very important for success of bariatric surgery. Patients above the age of 55 are expected to get less benefit from the operation than younger people. Still if he/she fulfils the selection criteria, particularly being of acceptable anaesthesia and surgery risk, it is not appropriate to deny a morbidly obese person the benefits of effective and durable weight loss.

29. All the following statements about bariatric operations are true, except:

- A. Sleeve (vertical) gastrectomy causes weight loss by inducing early satiety.
- B. Gastric band causes weight loss by causing early satiety.
- C. Liposuction treats morbid obesity by getting rid of excess fat.
- D. Roux en Y gastric bypass causes both restriction of food intake and malabsorption.
- E. Bariatric surgery results in improvement of type II diabetes mellitus.

C. Bariatric surgery is always done on the stomach and intestine. Excision and suction of excess fat and skin produce minimal weight loss that does not improve the health of a morbidly obese person.

Gastric banding and sleeve gastrectomy are restrictive operations. They depend on the creation of a small pouch that receives food and accommodates only a small portion of it. The intake of very little amount of food results in distension of the pouch and the early sense of satiety. Roux en Y gastric bypass adds another mechanism of action, which is malabsorption. Bariatric surgery markedly improve obesity comorbid conditions as type II diabetes, hypertension, osteoarthritis and sleep apnea

30. About gastrostomy all the following statements are true, except:

- A. A gastrostomy can be used for GIT decompression.
- B. A gastrostomy can be used for feeding.
- C. Percutaneous gastrostomy requires the use of a gastroscope.

- D. The track of Stamm's gastrostomy is lined with mucosa.
- E. A gastrostomy may be temporary or permanent.

D. The track of a Stamm's gastrostomy is lined with serosa so that when there is no need for the tube, it is pulled out and the gastrostomy closes spontaneously.

Choose the single best answer

1. About embryology of the gut:

- The caecum is a part of the hindgut.
- The superior mesenteric artery supplies the midgut.
- Volvulus of the hindgut is a common cause of neonatal intestinal obstruction.
- The inferior mesenteric artery supplies the foregut.
- The junction of the mid and hindguts is in the second part of duodenum.

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- The foregut includes the stomach and duodenum down to the ampulla of Vater. It is supplied by the celiac artery branches.*
- The midgut extends from the middle of 2nd part of duodenum (ampulla of Vater) till the junction of middle third with the left third of transverse colon. It is supplied by the superior mesenteric artery branches. It is volvulus of the midgut that is a common cause of neonatal intestinal obstruction.*
- The hindgut forms the remaining part of colon, rectum, and upper half of anal canal. It is supplied by the inferior mesenteric artery.*

2. About anatomy of the rectum, all the following statements are true, except:

- The rectum develops from the hindgut.
- The rectum has no taenia coli.
- The whole rectum is covered on the front and sides with peritoneum.
- The rectum is not a straight tube.
- Lymphatic drainage of the rectum goes mainly to inferior mesenteric nodes.

C. In the colon the longitudinal muscle layer forms three bundles; the taenia coli. The rectum, however has a complete circumferential longitudinal muscles, and hence, no taenia coli. The upper third of the rectum is covered with peritoneum on the front and sides, its middle third is covered on the front, while the lower third is completely extraperitoneal.

While the term rectum means straight, the rectum, actually, is not. It conforms with the concavity of the sacrum. And in addition, it has lateral curves.

The main lymphatic drainage is in an upward direction to lymph nodes along the superior rectal vessels, then to the inferior mesenteric lymph nodes. The lower part of the rectum may drain, in addition, to the middle rectal lymph nodes along the lateral ligaments.

3. About preoperative bowel preparation, all the following statements are true, except:

- Is done before surgery for perforated diverticulitis.
- Is done before elective resection of left colon cancer.
- Is not done before small intestinal surgery.
- Its aim is to reduce the bacteria content of the bowel.
- Intestinal antiseptics may be added to mechanical preparation.

A. Preoperative bowel preparation is intended only for elective colon surgery. It is needed with operations on the small intestine. For emergency colon operations such preparation is not done.

as there is no time to waste. Thus for a perforated or obstructed colon urgent surgery without preparation is the rule.

4. Choose the one correct statement about colostomy:

- A. A left iliac colostomy is always permanent.
- B. A colostomy may be an end or a loop type.
- C. After sigmoid resection a proximal colostomy and closure of distal stump is called Hartmann's procedure.
- D. A colostomy is always an incontinent opening.
- E. A colostomy may be complicated with external and/or an internal hernia.

A. After abdominoperineal resection of the rectum for low rectal cancer, a left iliac terminal colostomy is done. Because the anal canal and sphincters are removed, this is a permanent colostomy. Otherwise, a colostomy can be closed after a suitable interval to restore bowel continuity.

A colostomy is an incontinent stoma that requires fitting of a colostomy bag to collect stools. The confusion comes from the fact that sometimes a continent ileostomy can be fashioned. A valve is made in the ileal lumen at its exit on the skin to prevent passage of its fluid content. Evacuation is possible only by passing a catheter to overcome this valve.

Two types of hernia can occur in relation to a colostomy. A paracolostomy hernia is an external hernia that bulges on the anterior abdominal wall through the muscular defect that allows passage of the colon. An internal hernia can also occur if the surgeon fails to close the space lateral to the exiting colon between it and the parietal peritoneum.

5. About prophylactic parenteral antibiotics for elective colon surgery, all the following statements are true, except:

- A. Their use aims at reducing surgical site infection.
- B. Metronidazole is given to kill anaerobic bacteria.
- C. An aminoglycoside is used to kill gram -ve bacteria.
- D. Antibiotics are started one hour before surgery.
- E. Antibiotics are continued for five days after surgery.

E. In surgical practice prophylactic antibiotics are given about one hour before operation. This allows the presence of high antibiotic level in the tissues when contamination occurs. Antibiotics that are used for prophylaxis are not given for more than one day after the operation. Prolongation for more than that is ineffective, exposes the patient to antibiotic complications and runs the risk of allowing fungal proliferation and infection.

6. About ileostomy, all the following statements are true, except:

- A. An ileostomy brings out fluidy excreta.
- B. Ileostomy effluent is irritant to the skin.
- C. A good terminal ileostomy should protrude above the skin level.
- D. The main indication for a permanent ileostomy is diverticular disease of the colon.
- E. A temporary ileostomy is done to protect a low rectal anastomosis.

D. Ileostomy effluent is fluidy and contains digestive enzymes that are irritant to the skin. A good terminal ileostomy is fashioned like a nipple that protrudes above the skin level. This facilitates collection of the fluid in the ileostomy bag.

The main indication for a terminal ileostomy is after total proctocolectomy that is done for adenomatous polyposis coli and for ulcerative colitis. Surgery for diverticular disease usually entails resection on the left side of the colon, and certainly does not include the rectum. The incidence of leakage is high in a low rectal anastomosis. An ileostomy does not lower this incidence but rather reduces its septic consequences.

7. About intestinal injuries, choose the most appropriate statement:

- A. Colon injuries are less serious than small intestinal injuries.
- B. Tears of the small intestinal mesentery that are parallel to the bowel are less serious than those perpendicular to it.
- C. Adhesions reduce the incidence of intestinal injury at laparoscopy.
- D. Small intestinal injuries are usually repaired without making a stoma.
- E. Bleeding is the main life-threatening problem in cases of intestinal injury.

D. Peritonitis and subsequent septicaemia constitute the main threat to intestinal injury victims. In most of these cases blood loss is of secondary importance. Compare this with solid organ injury, e.g., that of the spleen, liver and kidneys. The main threat in cases of solid organ injuries is bleeding.

As the colon is more heavily populated with bacteria than the small intestine, colonic injuries carry a higher risk of severe peritonitis.

Transverse mesenteric tears that run parallel to the bowel cut more vessels and, consequently, are more likely to produce intestinal ischaemia and gangrene.

The small intestine is mobile on its mesentery. Adhesions convert it into a fixed target during the introduction of pneumoperitoneum needle or the trocar at laparoscopy and make it more susceptible to injury.

8. About intestinal fistulas, one statement only is correct:

- A. Most of external intestinal fistulas are the result of colon cancer.
- B. A common cause of colovesical fistula is colonic diverticulitis.
- C. Proximal bowel obstruction is cause of persistence of a fistula.
- D. A high-output fistula means an output that is more than 200ml/day.
- E. Most of postoperative fistulas require surgical intervention.

B. The majority of external intestinal fistulas follow surgery. In most of the cases the fistula closes under conservative treatment.

The commonest cause of a colovesical fistula is colonic diverticulitis.

A very important cause of persistence of a fistula is obstruction of the distal part of the bowel.

A high-output fistula means that the output is more than 500ml/day.

9. All the following factors cause persistence of an external intestinal fistula, except:

- A. Colonic Schistosomiasis.
- B. Hypoproteinaemia.

- C. Distal obstruction.
- D. Crohn's disease.
- E. Fistulising colon cancer.

A. Schistosomiasis of the colon is not known to interfere with closure of a fistula. The others do.

10. All the following statements about colovesical fistulas are true, except:

- A. May be caused by sigmoid carcinoma.
- B. May be caused by colonic diverticulitis.
- C. May be caused by ulcerative colitis.
- D. Pneumaturia is the specific symptom.
- E. Is associated with resistant urinary tract infection.

C. The sigmoid colon comes in contact with the upper surface of the urinary bladder. Sigmoid cancer can, thus, cause such a fistula. The same applies to diverticulitis whose main site is the left colon and sigmoid colon. In fact, colonic diverticulitis is the main cause of a colovesical fistula.

Ulcerative colitis is, principally, a mucosal disease. It is, therefore, not known to cause fistulas.

Passage of air with urine (pneumaturia) is pathognomonic of a colovesical fistula.

Bacteria pass from the colon to colonise the urinary bladder and cause intractable urinary tract infection.

11. About external intestinal fistulas, all the following statements are true, except:

- A. Patients with low-output fistulas can be nutritionally maintained by oral feeding.
- B. An intra-abdominal abscess that is related to the fistula can be percutaneously drained under CT guidance.
- C. The level of a fistula is best shown on ultrasound examination.
- D. Infliximab can help closure of a Crohn's fistula.
- E. Skin maceration is one of its complications.

C. In order of safety, simplicity and cost/benefit, the best feeding method is the oral, followed by the gastric, the jejuna, while last is the parenteral nutrition. A low-output fistula patient can be satisfactorily nourished through the oral route without raising the amount of fluid loss to a dangerous level.

An abscess may be present in relation to a fistula. Its presence drives the patient into a catabolic phase that impairs fistula healing. CT- or ultrasound-guided percutaneous drainage is a simple and safe technique of pus drainage.

Contrast radiography is the method of choice for detecting the origin of the fistula on the bowel side. If it is suspected to be of small intestinal origin, a barium meal with follow through is done. If suspected to be of colonic origin a barium enema is preferred.

Infliximab is a monoclonal antibody against tumour necrosis factor alpha. It proved useful in helping spontaneous closure of Crohn's fistulas.

12. About Meckel's diverticulum, all the following statements are true, except:

- A. It is present in the ileum, usually 2-3 feet from the ileocaecal valve.

- B. It is usually present on the mesenteric border.
- C. It is usually asymptomatic.
- D. If discovered accidentally at laparotomy for another reason in an elderly its excision is not indicated.
- E. It may initiate ileoileal intussusceptions.

B. A Meckel's diverticulum is present on the antimesenteric border of the ileum 2-3 feet from the ileocaecal valve.

It causes symptoms in 2-3% only of the affected people.

If it is going to complicate, it will usually do so in young people. Therefore, if accidentally discovered at laparotomy in a patient who is above the age of 40, there is no need to excise it. It may contain ectopic gastric mucosa, and sometimes pancreatic and colonic cells. The ectopic mucosa at the base of the diverticulum acts as a foreign body and forms the apex of an ileoileal intussusceptions.

13. About Meckel's diverticulum, all the following statements are true, except:

- A. It represents a patent part of the vitello-intestinal duct.
- B. It occurs in 2-3% of the population.
- C. It is formed of mucosa only.
- D. It may initiate volvulus.
- E. Its removal should include a rim of bowel around its base.

C. A Meckel's diverticulum is actually the proximal unobliterated part of the vitello-intestinal duct. In intra-uterine life this duct connects the midgut with the yolk sac. In the great majority of people this duct is completely obliterated and disappears at birth.

Unlike colonic diverticula which are formed of mucosa only, a Meckel's diverticulum is a full-thickness diverticulum that contains mucosa, musculosa and serosa.

There may be a band that connects the diverticulum with the umbilicus. This band may allow rotation of the ileum around its axis (volvulus).

Removal of a Meckel's diverticulum should include a rim of adjacent bowel in order to remove any heterotopic epithelium. For a broad-based diverticulum this may necessitate resection of an ileal segment and anastomosis.

14. The commonest cause of acute intestinal obstruction in adults is:

- A. Postoperative adhesions.
- B. Strangulated hernias.
- C. Colon cancer.
- D. Sigmoid volvulus.
- E. Crohn's disease.

A. The first three are the commonest causes of acute intestinal obstruction in adults, in this sequence. Colon cancer, particularly on the left side, is the commonest cause of colon obstruction in adults. Sigmoid volvulus is a rare cause of colonic obstruction.

15. All the following types of intestinal obstruction may resolve on conservative treatment without surgery, except:

- A. Adhesive intestinal obstruction.
- B. Infantile ileocaecal intussusceptions.
- C. Sigmoid volvulus.
- D. Paralytic ileus.
- E. Midgut volvulus.

E. Adhesive obstruction may resolve spontaneously with nasogastric aspiration while correcting fluid and electrolyte imbalances by IV fluids.

Early infantile ileocaecal intussusceptions can be treated by hydrostatic reduction under radiographic control or by pneumatic reduction under ultrasound control.

Early sigmoid volvulus can be untwisted and a rectal tube inserted by the help of a sigmoidoscope.

In all the above cases if obstruction persists or evidence of strangulation occurs, urgent surgery is indicated.

Treatment of Paralytic ileus is essentially non-surgical, except if there is peritonitis that needs drainage. Otherwise, nasogastric suction and IV correction of electrolyte imbalances, particularly hypokalaemia, usually restarts intestinal motility.

Midgut volvulus (volvulus neonatorum) is corrected only surgically.

16. All the following diseases predispose to colorectal cancer, except:

- A. Ulcerative colitis.
- B. Crohn's disease.
- C. A single adenomatous polyp.
- D. Adenomatous polyposis coli.
- E. Diverticular disease of the colon.

E. Ulcerative colitis is precancerous particularly with pancolitis of more than 10-year duration, or when dysplasia is present.

Crohn's disease carries a lower potential for malignancy.

A single adenomatous polyp carries a risk of malignant transformation particularly when it is more than 2cm in diameter, sessile, and of villous histology.

Adenomatous polyposis coli (APC), also called familial polyposis coli, carries a 100% risk if total proctocolectomy is not done.

Diverticular disease of the colon is not precancerous.

17. The commonest site of colorectal cancer is:

- A. Caecum.
- B. Transverse colon.
- C. Splenic flexure.
- D. Descending colon.
- E. Rectosigmoid area.

E. Two thirds of colorectal cancers are situated in the rectum and the sigmoid colon. 10% occur in the caecum. The remainders are distributed over the rest of the colon. Multiple tumours occur in 5% of cases.

18. Regarding colon carcinoma, one statement only is true:
- Caecal carcinoma commonly presents with intestinal obstruction.
 - Schistosomal polyps are premalignant.
 - Massive bleeding per rectum is the main symptom of left colon cancer.
 - Left colon cancer spreads to inferior mesenteric lymph nodes.
 - The disease is primarily treated by radiotherapy.

D. The caecum has a wide lumen that is difficult to obstruct until the cancer mass reaches a huge size. The early manifestations are those of vague ill health, namely, weakness, loss of appetite, loss of weight and anaemia. Other cancers that cause vague ill health symptoms are those of the stomach (body and fundus), body and tail of pancreas and hepatocellular carcinoma (HCC). While urinary bladder Schistosomiasis predisposes to squamous cell carcinoma, colonic affection is never precancerous.

If colon cancer causes manifest bleeding per rectum, it is usually of minor amount. The left colon is part of the hindgut, hence it is supplied with the inferior mesenteric artery and, hence its lymphatic drainage goes to the inferior mesenteric lymph nodes. The main line of treatment of colon cancer, whether it is early or late, is surgical.

19. The following conditions are examples of strangulation obstruction, except:

- Intussusception.
- Obstructing sigmoid cancer.
- Mesenteric vascular occlusion.
- Volvulus.
- Strangulated femoral hernia.

B. Strangulation means that the blood supply is cut off. This does not happen in a case of obstruction by colon cancer.

20. All the following findings raise suspicion of strangulation in a case of intestinal obstruction, except:

- Abdominal pain that persists after gastric decompression of the GIT by a tube.
- Persistent vomiting.
- Abdominal tenderness.
- Abdominal rigidity.
- Leukocytosis.

B. Vomiting occurs with both simple and strangulation obstruction.

The colicky pain of simple obstruction is caused by the pent up fluid and gas proximal to the block causing hyperperistalsis in an attempt to pass distally. This pain is greatly relieved by nasogastric tube suction. Strangulation obstruction, on the other hand, has an extra cause of pain, viz., bowel ischaemia. This is not affected by GI decompression.

Abdominal tenderness, rigidity, passage of blood per rectum, hypotension and leukocytosis all raise suspicion of strangulation.

21. All the following are possible complications of colonic diverticula, except:

- A. Bleeding per rectum.
- B. Colon stricture.
- C. Toxic megacolon.
- D. Pericolic abscess.
- E. Feculent peritonitis.

C. Toxic megacolon is a possible complication of ulcerative colitis.

22. All the following are possible causes of massive bleeding per rectum in adults, except:

- A. Colonic diverticular disease.
- B. Ulcerative colitis.
- C. Adenomatous polyposis coli.
- D. Ischaemic colitis.
- E. Angiodysplasia of the colon.

C. Colonic polyps may cause bleeding per rectum, which is always of little amount and is passed with stools and mucus.

One more cause of massive bleeding per rectum is severe bleeding from the upper GIT, e.g., varices or duodenal ulcer. Blood is cathartic. It stimulates intestinal hurry and blood may pass rapidly, unchanged per rectum.

23. About diverticular disease of the colon one of the following statements is true:

- A. Bleeding from the diverticula usually stops spontaneously.
- B. The disease usually affects people with tendency to diarrhoea.
- C. The disease is precancerous.
- D. All cases require resection of the affected colon segment.
- E. The diverticula are made of all layers of the bowel wall.

A. The diverticula are actually of the pulsion type, i.e., they are made of mucosa only. The mucosa bulges between the taenia coli at the weak points where the colon vessels enter the wall. That is why they commonly rupture and cause localized or generalized peritonitis. The diverticula may bleed profusely. Fortunately bleeding stops spontaneously in the majority of cases.

Uncomplicated diverticular disease is treated conservatively but dietary advice for bowel regulation. Even one attack of diverticulitis is not enough an indication for surgery.

24. About Crohn's disease, all the following statements are true, except:

- A. The disease affects the full thickness of the intestine.
- B. It is characterized by skip areas.
- C. The rectum is the commonest site of affection.

- D. It tends to cause strictures.
 E. It tends to cause fistulas.
 C. The ileocaecal region is its commonest site. In fact it is ulcerative colitis that should affect the rectum in all patients.

25. All the following cancers commonly produce vague symptoms of ill health, except:
 A. Cancer of the body of stomach
 B. Cancer of the tail of pancreas
 C. Cancer of the caecum
 D. Cancer of the middle third of oesophagus
 E. Hepatocellular carcinoma

D. The caecum and the body of the stomach have wide lumina. The tumour has to grow to a big size in order to cause obstruction. While growing to this size it produces vague manifestations of ill health, namely, weakness, easy fatigue, poor appetite, weight loss and anaemias. Cancers of the body and tail of pancreas are away from the bile duct, in contrast to those of the head that produce jaundice while still of small size. Hepatocellular carcinoma usually occurs on top of cirrhosis, i.e., in patients with poor hepatic functional reserve. Unless the tumour arises close to the porta hepatis, it produces the same manifestations. On the other hand the oesophagus has a narrow lumen. Cancer causes dysphagia at an early stage and alerts the patient to seek medical advice well before the tumour becomes big enough to cause the ill-health manifestations.

26. About ulcerative colitis, all the following statements are true, except:
 A. The disease affects the intestinal mucosa.
 B. The disease should include the rectum and possibly more proximal colon without skip areas.
 C. Arthritis may affect these patients.
 D. Diarrhoea, with mucus and blood, is the main symptom.
 E. The treatment is always surgical.

E. Ulcerative colitis is essentially a mucosal disease. In addition to the colonic complications, extra-intestinal complications may also affect these patients.

Ulcerative colitis is essentially a medical disease. It is usually controlled by diet regulation and medications. Indications for surgery are:

- Failure of medical management to control the disease leading to a state of chronic ill health with persistent diarrhoea, anaemia and malnutrition.
- Development of complications as toxic megacolon with perforation (urgent surgery), or colon cancer.
- Long-standing pancolitis where biopsy shows dysplasia.

The standard operation is total proctocolectomy.

27. For a resectable sigmoid cancer with solitary metastatic nodule in the left liver lobe, the most suitable management is:

- A. Surgery is contraindicated and palliative chemotherapy is given.
- B. Left hemicolectomy and segmental resection of the metastasis
- C. Left hemicolectomy and radiotherapy to the liver.
- D. Left hemicolectomy and chemotherapy.
- E. Radiotherapy to the sigmoid colon and to the liver.

B. For a resectable colorectal cancer, the presence of a solitary metastatic liver nodule does not signify non-curability. The policy of radical surgery of the primary and concomitant local resection of the metastasis with a safety margin still bears hope for cure. Unfortunately, this does not apply to malignancies anywhere else. One metastatic liver nodule with primary stomach, pancreas or breast cancer indicates incurable disease.

28. The common causes of neonatal intestinal obstruction include all the following, except:

- A. Small intestinal atresia.
- B. Meconium ileus.
- C. Idiopathic ileocaecal intussusceptions.
- D. Hirschsprung's disease.
- E. Midgut volvulus.

C. Idiopathic ileocaecal intussusceptions do not affect the neonates. Its peak incidence is between the 6th and the 12th months of life, i.e., in infancy. This is why it is also called infantile ileocaecal intussusception.

29. In a child with massive bleeding per rectum, the commonest cause is:

- A. Peptic ulcer in a Meckel's diverticulum.
- B. Ileocaecal intussusceptions.
- C. Colonic diverticulitis.
- D. Carcinoma of the rectum.
- E. Mesenteric vascular occlusion.

A. The base of a Meckel's diverticulum commonly contains heterotopic epithelium; gastric and pancreatic. Peptic ulcer may occur in the diverticulum and may then bleed. In fact this is the commonest cause of massive bleeding per rectum in children.

Ileocaecal intussusceptions produces a small amount of blood that is mixed with mucus, the so called "red-currant jelly stools".

The other three are not diseases of childhood. Furthermore, rectal cancer and mesenteric vascular occlusion are not among the usual causes of massive bleeding per rectum, even in adults.

30. About volvulus neonatorum, one statement only is true:

- A. The band of Ladd obstructs the duodenum
- B. It is volvulus of the foregut

- C. It is volvulus of the hindgut
- D. It is a form of simple obstruction
- E. At the end of operation for this disease, the caecum is fixed in the right iliac fossa

A. The band of Ladd is a fibrous band that stretches from the duodenum to the posterior abdominal wall on the right side. In addition to the midgut volvulus, which is a form of closed loop strangulation obstruction, the band of Ladd crosses the duodenum and obstructs it. At operation the volvulus is untwisted and the band of Ladd is divided to release duodenal obstruction. The caecum is not to be fixed in the right iliac fossa but is left in its place in the upper abdomen.

Choose the single best answer

1. About the dentate line, all the following statements are true, except:

- A. It demarcates the junction of hindgut with the proctodeum.
- B. It separates pain-sensitive area below from pain-insensitive area above it.
- C. Anal glands open at this level.
- D. Lymphatic drainage of the anal canal below it goes to inguinal lymph nodes.
- E. It separates columnar epithelium above from cuboidal epithelium below it.

E. The anal canal below the dentate line has stratified squamous epithelium lining. It differs from the skin in that it is devoid of hair, sweat and sebaceous glands.

2. About the faecal continence mechanism, all the following statements are true, except:

- A. The internal sphincter is made of somatic muscles.
- B. The external sphincter is innervated by the pudendal nerve.
- C. The internal anal sphincter has the major contribution in the resting anal pressure.
- D. Contraction of the puborectalis pulls the anorectal junction anteriorly.
- E. The mucosa of the upper part of anal canal contains receptors that distinguish between flatus and faeces.

A. The internal anal sphincter is the thickened extension of inner circular muscle layer of the rectum. Hence, it is formed of involuntary visceral muscles that are under autonomic control. The internal sphincter contributes about 80% of the resting anal canal pressure. The puborectalis muscle forms a sling that pulls the anorectal junction forwards to maintain its right angle. This is an important mechanism that maintains continence. In response to rectal distension by stools or flatus, the internal sphincter relaxes allowing a small sample of these rectal contents to enter the upper anal canal. The sensitive epithelium in this area can discern its type whether it being flatus, liquid, or solid stools. If the circumstances are convenient, the subject relaxes the puborectalis thus widening the anorectal angle, and also relaxes the external sphincter. Straining will expel the rectal contents to the outside. If the subject does not wish to evacuate the rectum, the puborectalis and the external sphincter contract to push the sample of luminal contents upwards.

3. All the following are painful conditions, except:

- A. Pilonidal sinus.
- B. Perianal haematoma.
- C. Thrombosed haemorrhoids.
- D. Anal fissure.
- E. Perianal abscess.

A. Pilonidal sinus is a painless disease. Pain arises only when it gets infected, forming an abscess.

4. About pilonidal sinus, all the following statements are true, except:
- The condition is more frequently seen in females than in males.
 - It may be asymptomatic.
 - It contains loose hair that is not attached to its wall.
 - Pilonidal sinus is usually a clinical diagnosis that requires no imaging studies.
 - A pilonidal sinus does not involve the underlying sacrum.

A. The disease typically affects young adult males with dense, dark, strong hair. Females are also affected but to a lesser extent.

The pilonidal cavity is present in the subcutaneous plane and is rather superficial. The old teaching of excising it down to the periosteum of the sacrum is no more practiced. It leaves an unnecessarily big cavity.

5. About acute anal fissure, one statement only is true:
- The commonest cause is Crohn's disease.
 - The internal sphincter is markedly spastic.
 - A sentinel pile is seen at the anal verge.
 - In the office, the fissure can be conveniently seen by parting the edges of the anal verge.
 - Surgery is the only treatment.

B. The commonest cause is the passage of a bulky hard motion that overstretches the anal canal and induces a longitudinal crack in its lower part. The commonest position in the anal canal circumference is the midline posteriorly.

As the lower half of the anal canal contains sensory nerves that conduct pain sensation, passage of stools induces intense anal pain. The lower part of the internal sphincter goes into reflex spasm to guard against such a painful passage of a motion.

Marked internal sphincter spasm usually does not allow visualization of the fissure by the surgeon.

An acute fissure has neither sentinel pile nor hypertrophied anal papilla. These are features of a chronic fissure.

Many acute fissures can be treated conservatively by local anaesthetic creams, analgesics, stool softeners and warm Sitz baths. Resistant cases will require internal sphincterotomy.

6. About chronic anal fissure, all the following statements are true, except:
- This is a longitudinal wound in the lower part of anal canal.
 - The fissure can be seen by parting the edges of the anal verge.
 - The fissure is tender and indurated.
 - The commonest site is the midline anteriorly.
 - The classic treatment is internal sphincterotomy.

D. A chronic anal fissure goes into remissions and exacerbations of pain. Usually the exacerbations are initiated by the passage of a hard motion.

A chronic fissure produces spasm of the internal sphincter, but it is not as intense as that caused by an acute fissure. This mild sphincter spasm does not prevent visualization of the longitudinal crack when the edges of the anal verge are gently parted away. By far, the commonest site is the

midline posteriorly. An anterior midline fissure is less common and is more frequently seen in females than in males.

A chronic fissure is characterized by induration (as a result of fibrosis). It may also have a sentinel pile at its lower end (at anal verge) and a hypertrophied anal papilla at its upper end. The only treatment of a chronic fissure is surgery. The usual operation is lateral internal sphincterotomy. The lower part of internal sphincter is divided in either the left or the right lateral position. This brings immediate marked reduction of pain and allows healing of the fissure.

7. A 25 year old woman complains of painful defecation. Pain remains for a few hours afterwards. It is occasionally associated with a drop of fresh blood that is observed on toilet paper. The most probable diagnosis is:

- A. Low anal fistula.
- B. Perianal abscess.
- C. Pilonidal sinus.
- D. Anal fissure.
- E. Haemorrhoids.

D. This is the classic picture of anal fissure.

An anal fistula that is not collecting pus is painless. An abscess, however, is painful but pain is continuous and throbbing. It is commonly associated with fever. Furthermore, an abscess does not cause bleeding.

8. About haemorrhoids, all the following statements are true, except:

- A. The enlargement and prolapse of anal arterio-venous cushions causes haemorrhoids.
- B. The incidence of haemorrhoids is higher in portal hypertension patients than in the rest of the population.
- C. Chronic constipation predisposes to haemorrhoid formation.
- D. Cancer of the rectum can cause haemorrhoids.
- E. Mother piles usually occur at left lateral, right posterior and right anterior positions of anal canal.

B. Though the anal canal is a meeting site of portal and systemic venous systems, it was observed that the incidence of haemorrhoids in portal hypertension patients is the same as in the rest of the population.

Carcinoma of the rectum may obstruct tributaries of the superior rectal vein and cause secondary haemorrhoids. Rectal carcinoma should be excluded in patients with bleeding per rectum, even if there are evident haemorrhoids.

The positions of mother piles are commonly referred to as 3, 7 and 11 o'clock positions.

9. About second degree haemorrhoids, all the following statements are true, except:

- A. May cause bleeding per rectum.
- B. Protrude out of the anus at defecation and reduce spontaneously.
- C. If uncomplicated, they are painless.

- D. Neglected cases can cause anal fistula.
 - E. Can be treated by rubber band ligation.
- D. An anal fistula is the sequel of an abscess, not haemorrhoids.*
10. About haemorrhoidal bleeding, one statement only is true:
- A. It occurs only in acutely thrombosed piles.
 - B. It is bright red.
 - C. It is mixed with the faecal matter.
 - D. It is usually painful.
 - E. It is most observed on the underwear.
- B. Haemorrhoidal bleeding is painless and not mixed with stools. It is bright red as it has its origin from the arteriovenous cushions of the anal canal. Blood usually spurts or is dripping when the patient is squeezing to expel stools. Blood is usually observed in the toilet bowl.*

11. About rubber band ligation of haemorrhoids, all the following statements are true, except:
- A. It is the ideal treatment of bleeding third degree haemorrhoids.
 - B. It can be done without anaesthesia.
 - C. The bands are applied above the dentate line.
 - D. It requires the use of an anoscope.
 - E. Pain after this procedure is less than pain after open haemorrhoidectomy.

A. Rubber band ligation is most useful in stopping bleeding from first and second degree haemorrhoids. For third degree haemorrhoids, band ligation is not enough to control the prolapse; these patients require haemorrhoidectomy. Sclerotherapy and infra-red photocoagulation are also used to stop bleeding from small haemorrhoids. They are probably as good as rubber band ligation for first-degree cases, but for second degree cases band ligation is superior. Band ligation, sclerotherapy and infra-red photocoagulation are commonly done as office procedures without anaesthesia. An anoscope is inserted and through which the rubber bands are applied at the necks of haemorrhoids above the dentate line. The upper half of the anal canal is known to be insensitive to pain.

12. About the treatment of haemorrhoids, all the following statements are true, except:
- A. Maximal anal dilatation under anesthesia is the standard treatment of thrombosed piles.
 - B. Third degree haemorrhoids can be treated by open haemorrhoidectomy (Mellishan and Morgan's operation).
 - C. Third degree haemorrhoids can be treated by closed haemorrhoidectomy (Fergusson's operation).
 - D. Stapled haemorrhoidectomy by circular stapler is suitable for third degree haemorrhoids.
 - E. A high-fibre diet and regular soft motions are useful for haemorrhoid patients.

A. Such anal dilatation is mentioned to be condemned. It results in a degree of incontinence, even after many years. Acutely thrombosed haemorrhoids are treated conservatively; a minority will need urgent haemorrhoidectomy.
 A high-fibre diet with plenty of water is advised to ensure soft regular motions. This is usually enough treatment for minor cases and is a useful adjunct to surgery for advanced cases.
 All three surgical techniques are suitable for the treatment of third degree haemorrhoids. Stapled haemorrhoidectomy has the advantage of less postoperative pain.

13. Complications of haemorrhoidectomy include all the following, except:

- A. Acute urinary incontinence.
- B. Reactionary haemorrhage that occurs within the first 24 hours.
- C. Secondary haemorrhage that occurs within 1-2 weeks.
- D. Faecal incontinence.
- E. Anal stenosis.

A. Haemorrhoidectomy causes considerable postoperative pain. This may result in reflex retention of urine, rather than incontinence.
 Faecal incontinence can occur if the whole anal sphincter mechanism is divided.
 Anal stenosis may follow haemorrhoidectomy if the surgeon does not leave intact mucocutaneous bridges between the raw areas.

14. One of these investigations should be done before any haemorrhoidectomy:

- A. Biopsy of at least one of the haemorrhoids.
- B. Endorectal ultrasound.
- C. Sigmoidoscopy.
- D. Full colonoscopy.
- E. Occult blood in stools.

C. Sigmoidoscopy should be done before any haemorrhoidectomy in order to exclude rectal cancer. It can be done in the outpatient department or in the operating room, when the patient is under anaesthesia, before excising the haemorrhoids.

15. Complications of haemorrhoids include any of the following, except:

- A. Anaemia.
- B. Acute thrombosis.
- C. Faecal incontinence.
- D. Haemorrhoid gangrene.
- E. Portal pyaemia.

C. Haemorrhoids are submucosal lesions that do not affect the anal sphincter mechanism.

16. After straining at defecation, a healthy 26-year old man develops a painful bump at the anal verge. Pain is continuous. There is no fever. On examination a bluish 1.5x1cm

tender swelling is present in the right edge of anal verge and is not extending inwards. The most probable diagnosis is;

- A. Prolapse of uncomplicated haemorrhoid.
- B. Acutely thrombosed internal haemorrhoid.
- C. Acute perianal haematoma.
- D. Perianal abscess.
- E. Sentinel pile.

C. this is the classic presentation of an acute perianal haematoma; sometimes called external thrombosed piles.

17. About perianal abscess, all the following statements are true, except:

- A. In most of the cases it is caused by infection of an anal gland.
- B. The abscess lies some distance away from the anal verge.
- C. Incision and drainage should be urgently done even if fluctuation cannot be elicited.
- D. Spontaneous rupture may be followed by the development of an anal fistula.
- E. Timely incision and drainage may be followed by the development of an anal fistula.

B: The majority of abscesses start as infection of an anal gland. These glands are present in the intersphincteric space and have their ducts open at the dentate line.

A perianal abscess projects just next to the anal verge. An ischiorectal abscess, however, causes a tender induration some distance lateral to the anal verge. If neglected, an ischiorectal abscess can extend through the post-sphincteric space to the other ischiorectal fossa.

Spontaneous rupture is likely to be followed by the development of an anal fistula, the inner opening of which is actually the opening of the infected anal gland; at the dentate line. Timely incision and drainage of a perianal abscess may reduce the incidence of fistula formation, but will not eliminate it. The patient should be informed of this possibility.

18. About anal fistulas, all the following statements are true, except:

- A. The main presentation is discharge.
- B. Patients are prone to develop repeated suppuration in the fistula track.
- C. Multiple posterior external openings usually have a common internal opening in midline posteriorly.
- D. Multiple anterior external openings usually have separate internal openings.
- E. Fistulotomy should be followed by primary skin closure to avoid faecal contamination.

E. Anal fistulotomy or fistulectomy wounds should not be sutured, as this will predispose to wound infection and recurrence of the fistula. To the contrary, the wound edges are trimmed off to leave it widely open in order to prevent premature skin closure before the cavity is obliterated with granulation tissue.

19. About anal fistulas, all the following statements are true, except:

- A. A low anal fistula has its internal opening at the dentate line.
- B. The differential diagnosis of a solitary midline external opening is suppurative hidradenitis.
- C. Crohn's disease is one of the causes of anal fistula formation.
- D. Anal fistula is one cause of pruritus ani.
- E. Excised fistula tissues should be histologically examined.

Hidradenitis suppurativa is chronic suppuration of the apocrine sweat glands of the perianal region, the axilla or the groin. The affected area is studded with multiple discharging sinuses that are not connected to the anal canal. Treatment is wide excision and skin grafting.

20. About high anal fistulas, all the following statements are true, except:

- A. If the internal opening is above the anorectal ring, it would be a high anal fistula.
- B. A high anal fistula is far less frequent than a low one.
- C. Probing a low fistula can create a high internal opening.
- D. The main risk of surgery is severe bleeding.
- E. Staged surgery is safer for a high fistula than a one-stage operation.

Surgery for a high fistula requires division of the entire anal sphincter mechanism and would produce incontinence if done in one stage. A staged fistulotomy is, therefore, performed instead of single-stage procedure. The initial stage is to deroof the lower part of the intersphincteric component of the track. A seton suture is left in place through the rest of the track and is snugly tied around the puborectalis and external sphincter. Two weeks later the rest of the track is laid open, guided by the seton suture. The fibrosed adherent ends of the sphincter are claimed to be prevented from retracting wide apart, thus maintaining the mechanism of continence. High anal fistulas should be operated upon by specialized colorectal surgeons.

21. About carcinoma of the lower part of anal canal, all the following statements are true, except:

- A. It is an adenocarcinoma.
- B. It tends to be painful.
- C. Lymphatic spread is to the inguinal lymph nodes.
- D. Surgical treatment typically requires making a permanent colostomy.
- E. The tumour is radiosensitive.

The majority of anal canal cancers are of the squamous carcinoma type. The adenocarcinoma minority arise from the area above the dentate line. The standard operation is abdomino-perineal resection of the rectum and anal canal and, thus, requires fashioning a permanent left iliac colostomy. Inguinal lymphadenectomy is added if these lymph nodes are involved.

Choose the single best answer

1. About the free border of the lesser omentum, all the following are true, except:
- It is called the hepatoduodenal ligament.
 - The common bile duct is anterior and to the right.
 - It contains the hepatic veins.
 - It contains the portal vein.
 - It contains the hepatic artery.

C. The three hepatic veins drain into the inferior vena cava just before it pierces the diaphragm. The free border of the lesser omentum is called the hepatoduodenal ligament. It contains the portal vein posteriorly, the bile duct on the right and hepatic artery on the left.

2. The caudate lobe is:
- Segment I.
 - Segment II.
 - Segment III.
 - Segment IV.
 - Segment V.

A. The caudate lobe is segment I. It lies between the porta hepatis anteriorly and the inferior vena cava (IVC) posteriorly. The caudate lobe does not belong neither to the right nor the left liver lobe. Its blood supply comes equally from the right and left hepatic arteries and portal veins. It is drained by very short veins directly into the IVC.

3. About surgical anatomy of the liver, all the following are true, except:
- The caudate lobe is supplied by the right and left hepatic arteries.
 - A portal triad contains a bile duct, a hepatic artery and a portal vein.
 - Segments II and III form the part of the liver to the left of the falciform ligament.
 - The falciform ligament divides the liver into the surgical right and left lobes.
 - The hepatic veins drain into the inferior vena cava.

D. From the surgical point of view, the liver is divided into two almost equal lobes by the middle hepatic vein, the plane of division lies to the right of the falciform ligament and passes from the gall bladder fossa to the inferior vena cava.

4. About liver function tests, all the following are true, except:
- Prothrombin time is markedly prolonged in patients with haemolytic jaundice.
 - Alkaline phosphatase is markedly elevated in cases of obstructive jaundice.
 - Conjugated bilirubin shows more marked elevation than the unconjugated form in cases of obstructive jaundice.
 - ALT and AST are markedly elevated in cases of viral hepatitis.
 - Serum albumin is reduced in cases of liver cirrhosis.

A. Prothrombin is formed in the liver. Its manufacture requires healthy liver cells and the availability of vitamin K. Hypoprothrombinaemia, therefore, occurs in cases of liver cirrhosis and in cases of obstructive jaundice. In the latter the absence of bile salts in the small intestine prevents vitamin K absorption. In patients with haemolytic disorders the liver is healthy and vitamin K is normally absorbed from the intestine. In addition to the formation of prothrombin, another synthetic function of the liver is the synthesis of albumin. Consequently liver cirrhosis patients are prone to have hypoprothrombinaemia and hypoalbuminaemia. The enzyme alkaline phosphatase is elevated in cases of bile stasis and with bone diseases, particularly bone resorption and destruction.

5. About liver injuries, all the following are true, except:

- A. Prognosis of liver injury depends largely on the presence of associated injuries.
- B. Chest stabs higher than the 6th intercostal space do not injure the liver.
- C. A stab injury in the liver causes damage only in its track.
- D. A bullet injury shatters the liver.
- E. In a stable patient, minor liver injuries can be treated conservatively.

B. Chest stabs as high as the 4th intercostal space can transfix the diaphragm and injure the liver (and / or the spleen).

6. Isolated injury of one of the following organs is usually treated conservatively:

- A. Spleen.
- B. Kidney.
- C. Liver.
- D. Colon.
- E. Small intestine.

B. Being a retroperitoneal organ, an isolated injury of the kidney is likely to stop bleeding spontaneously because of the tamponade effect of the posterior peritoneum on the haematoma. On the other extreme, splenic injury is least likely to stop bleeding on its own. This is because intra-splenic vessels are sinusoidal. They lack muscle coats, and hence, cannot go into vasoconstriction.

While the main danger of solid organ (spleen, liver, kidneys) injury is bleeding, that of hollow organs is peritonitis. Intestinal injuries are never treated conservatively. Exploration to control the leak is mandatory.

7. About liver injuries, one the following is true:

- A. The main danger of liver injury is biliary peritonitis.
- B. Pringle's manoeuvre entails control of the hepatic veins.
- C. Packing of liver injuries should not be tried as it wastes valuable time.
- D. Suturing a liver tear can cause haemobilia.
- E. All liver injuries require emergency surgery.

D. The main danger of liver injury is bleeding. However, minor injuries can stop bleeding spontaneously. Provided there is close clinical, laboratory and imaging follow-up, a stable patient with isolated minor liver injury can be treated conservatively. Pringle's manoeuvre is temporary control of the structures at the free border of lesser omentum. This is achieved either with a vascular clamp or with the surgeon's fingers. Flow in the main two sources of blood to the liver; namely the hepatic artery and the portal vein is stopped. This manoeuvre allows the surgeon to localize bleeding points and to control them. Firm packing of liver lacerations is a useful method in the haemodynamically unstable patient. It controls bleeding in a short time. The patient is then transferred to ICU for stabilization. Within 24-48 hours a stable patient is returned to the operating theatre for removal of the packs and definitive control of bleeding. This is an example of a policy that is called "damage control surgery", a policy that results in better survival of the severely injured trauma victim. If possible, suturing a liver tear is better avoided as blood accumulates in the resulting cavity and can get access to torn bile ducts. The resulting haemobilia can cause biliary obstruction.

8. Cause of liver abscess include all the following, except:

- A. Spread by lymphatics from acute appendicitis.
- B. Spread by the portal vein from colonic diverticulitis.
- C. Spread through the biliary tree from cholangitis.
- D. Spread by the arterial system from a remote pyogenic focus.
- E. Infection by *E. histolytica* that reaches the liver through the portal vein.

A. Acute appendicitis rarely causes a liver abscess. If it happens, infection gets to the liver through the portal vein (portal pyaemia), not through lymphatics.

9. Regarding amoebic liver abscess, all the following statements are true, except:

- A. *E. histolytica* travels from the colon to the liver through the portal vein.
- B. Amoebic liver abscess contains brown fluid.
- C. Differential diagnosis includes hepatocellular carcinoma.
- D. Complications include empyema.
- E. Surgical incision and drainage is the main line of treatment.

E. An amoebic liver abscess characteristically contains brown fluid that is referred to as "chocolate or anchovy sauce pus". This is, in fact, liquefied liver tissue. Hepatocellular carcinoma in black Africans assumes a rapidly progressive course with pain and constitutional symptoms that simulate those of an amoebic abscess. Treatment with metronidazole is the first choice as it gives excellent results. Guided percutaneous aspiration is done if there is a residual abscess. The indications for open surgical drainage are limited and include:

- Presence of secondary infection.
- If the abscess is pointing.
- If aspiration is difficult because of a multilocular abscess or the presence of thick pus.

10. Regarding hydatid disease, all the following statements are true, except:

- A. Is caused by *Ecchinococcus granulosus*.
- B. Man is the definitive host.

- C. The liver is the commonest site of infection
- D. Can be diagnosed by the haemagglutination test.
- E. Is resistant to treatment by metronidazole.

B. Dog is the definitive host, while the usual intermediate host is sheep. Man is accidentally infected as an intermediate host.

The liver is the most frequent site of a hydatid cyst. It may contain multiple cysts. The liver is followed, in frequency, by the lungs and the spleen. Rarely the brain and bones are infected. A haemagglutination test is more diagnostic than the old Casoni test. Still it may be negative in the presence of hydatidosis. Addition of ultrasound (or CT scan) increases diagnostic accuracy. Metronidazole is a good treatment for amoebiasis and for most of anaerobic bacteria, but not for hydatidosis. Echinococcus granulosus infection responds to mebendazole and to albendazole.

11. About liver hydatid disease, all the following statements are true, except:
- A. Man is the usual intermediate host.
 - B. Multiple cysts may be present.
 - C. A cyst may communicate with a bile duct.
 - D. Surgery should include removal of the germinal layer.
 - E. Surgery carries the risk of inducing an allergic reaction.

A. The usual intermediate host is sheep. Man is occasionally, infected through vegetables or hands that become contaminated with dog's excreta.
A cyst may communicate with a bile duct. In this case the cyst fluid is yellow. At operation the germinal layer should be removed and effort is made to look for biliary connection in the wall of the resulting cavity. If any is present, it should be closed with a stitch.
Hydatid fluid can cause severe allergy. One should be ready at surgery to detect and to treat it as soon as it develops. Every effort is also made to prevent spillage and implantation of the parasite's scolices in the peritoneal cavity.

12. About portal hypertension, all the following statements are true, except:
- A. The normal portal pressure is 8-12cm water.
 - B. The commonest causes of portal hypertension are viral hepatitis and alcoholism.
 - C. Viral hepatitis A does not cause portal hypertension.
 - D. Schistosomiasis carries a worse prognosis than post-hepatitis cirrhosis.
 - E. The most serious site of porta-systemic anastomoses is at the lower oesophagus and upper stomach.

D. Viral hepatitis A resolves spontaneously without ill effects. On the other hand types B and C can cause liver cirrhosis and predispose to the development of hepatocellular carcinoma.
Schistosomiasis of the liver causes periportal fibrosis. This impedes flow in the portal vein branches and causes portal hypertension. Hepatitis B and C can cause liver cirrhosis. In addition to fibrosis the pathology of cirrhosis includes destruction of liver cells. Undoubtedly, therefore, cirrhosis carries a worse prognosis than the pure fibrosis of Schistosomiasis.

The most serious site of porta-systemic anastomoses is at the lower oesophagus and upper stomach because this is the site where oesophageal and gastric varices form, bleeding varices is the major killer in these patients.

13. To stop bleeding from oesophageal varices, the first choice is:
- Emergency porta-caval shunt.
 - Emergency splenectomy.
 - Emergency oesophageal transaction with a circular stapler.
 - Conservative treatment with beta blockers.
 - Emergency endoscopic sclerotherapy.

E. Emergency endoscopic variceal sclerotherapy (or band ligation) is the first-line treatment for control of bleeding varices. It is safer than surgery in these frail patients. It is also highly effective and can be easily repeated.

Other conservative methods are the use of IV vasopressin and/ or the use of Sengstaken tube to compress the varices.

Emergency surgery carries a high mortality, particularly shunt surgery. Splenectomy has no effect on bleeding varices.

If repeated endoscopic treatment fails and surgery is mandatory, oesophageal transaction and anastomosis with a circular stapler interrupts the portosystemic connection and is, therefore, the preferred operation.

Beta blockers are used on an elective chronic basis to reduce portal pressure and to prevent re-bleeding. They are contraindicated in acute bleeding situations as they inhibit the sympatho-adrenal response that maintains a normal blood pressure.

14. To prevent and treat hepatic encephalopathy, all the following methods can be used, except:

- Porta-caval shunt surgery to prevent bleeding from varices.
- Control of bleeding from oesophageal varices by endoscopic sclerotherapy.
- Oral intestinal antiseptics.
- Oral lactulose.
- Enemas.

A. In a patient with liver cirrhosis, the occurrence of bleeding from oesophageal varices is very likely to cause encephalopathy because:

- Blood in the colon is acted upon by the bacteria to release excess ammonia that causes encephalopathy.*
- Shock further impairs the liver function that is already impaired by cirrhosis. It cannot, therefore, transform ammonia into urea.*

A surgical anastomosis between the portal vein and the inferior vena cava lowers portal pressure and reduces the possibility of bleeding. However, the main complication of this operation is that it causes encephalopathy because ammonia that is absorbed from the intestine will not reach the liver to be transformed into harmless urea. Ammonia passes unmetabolized through the shunt to the systemic circulation to affect the brain.

15. About Child's classification, all the following statements are true, except:
- A. There are five grades in this classification.
 - B. Child class A carries the best prognosis.
 - C. In a class B patient serum albumin lies between 30-35g/L.
 - D. In a class B patient serum bilirubin lies between 2-3mg/dL.
 - E. Easily-controlled ascites may be present in a Child class B patient.

A. This is a grading system for liver functions. There are only three grades: A is the best, B is intermediate while C is the worst.

16. About ascites, all the following statements are true, except:
- A. Malignant ascites is commonly haemorrhagic.
 - B. Ascites of liver cirrhosis is a transudate.
 - C. Ascites of tuberculous peritonitis has a protein content less than 30g/L.
 - D. One of the factors that cause ascites in patients with liver cirrhosis is hypoalbuminaemia.
 - E. One of the sources of ascites in patients with liver cirrhosis is lymph from the surface of the liver.

C. Peritoneal inflammation produces an exudate that contains more than 30g/L.

17. One only of the following is a selective shunt operation to prevent future bleeding from oesophageal surgery:

- A. End to side Porta-caval shunt.
- B. Distal lieno-renal shunt.
- C. Proximal lieno-renal shunt.
- D. Mesenterico-caval shunt.
- E. TIPSS.

B. Distal lieno-renal shunt, also known as Warren operation, selectively decongests the lower oesophagus and upper stomach. The rest of the GI venous blood still goes to the liver, thus markedly reducing the possibility of hepatic encephalopathy.

All other procedures are non-selective shunts that raise the risk of encephalopathy.

TIPSS (Transjugular Intrahepatic Porto-Systemic Shunt) is a simple procedure that is done under local anaesthesia to create an intrahepatic porto-systemic shunt under radiographic control.

18. About the portal venous system, all the following statements are true, except:
- A. The portal vein is formed by the confluence of the superior and inferior mesenteric veins.
 - B. The portal vein is formed behind the neck of the pancreas.
 - C. The portal vein lies in the anterior wall of the opening to the lesser sac (foramen of Winslow).
 - D. The left gastric vein ends in the portal vein.
 - E. The rectum drains into the portal venous system.

A. The portal vein is formed by the confluence of the superior mesenteric and the splenic veins behind the neck of the pancreas.

19. About liver tumours, all the following statements are true, except:
- A. Benign tumours are more frequent in females.
 - B. Hepatocellular carcinoma (HCC) is more frequent in males.
 - C. Focal nodular hyperplasia is related to the use of contraceptive pills.
 - D. Focal nodular hyperplasia is precancerous.
 - E. Alfa fetoprotein is not elevated in patients with liver cell adenoma.

D. Focal nodular hyperplasia is a harmless lesion of the liver whose main importance is the difficult differentiation from neoplastic focal lesions.

20. About liver haemangioma, one statement only is true:
- A. This is a rare condition.
 - B. Most of liver haemangiomas cause pain.
 - C. The best way to diagnose it is by laparoscopy.
 - D. Biopsy is necessary for diagnosis.
 - E. Surgical resection is rarely needed.

E. Haemangiomas of the liver are common findings on imaging studies (CT or ultrasound) that are done for other indications. They are asymptomatic in the great majority of cases. They rarely rupture to cause haemorrhage. A liver haemangioma can be confidently diagnosed using CT with IV contrast as it shows its hypervascularity. Laparoscopy is an invasive investigation. It can show only the surface of the liver, not its depth and not its posterior aspect. Certainly a biopsy is contraindicated as it can lead to severe bleeding.

21. All the following statements about cholangiocarcinoma are true, except:
- A. Cholangiocarcinoma may affect intra or extrahepatic bile ducts.
 - B. Infestation with *Clonorchis sinensis* is a predisposing factor.
 - C. The highest incidence is in the Far East.
 - D. It is, in fact, an adenocarcinoma.
 - E. Fortunately intrahepatic cholangiocarcinoma is usually discovered at an early stage.

E. Primary liver cancer, whether it is HCC or cholangiocarcinoma, is asymptomatic or causes vague symptoms of ill health. By the time they cause marked symptoms, they are usually too advanced to cure.

22. All the following predispose to hepatocellular carcinoma (HCC), except:
- A. Hepatitis B.
 - B. Hepatitis C.
 - C. Liver cirrhosis.
 - D. Aflatoxin ingestion.
 - E. Previous irradiation of the abdomen.

E. Previous irradiation is a cause of papillary thyroid cancer, not liver cancer.

23. Regarding liver malignancy, all the following statements are true, except:

- A. In patients with hepatocellular carcinoma (HCC), carcinoembryonic antigen is elevated.
- B. Hepatocellular carcinoma (HCC) is the commonest primary malignancy of the liver.
- C. Hepatocellular carcinoma (HCC) usually develops on top of liver cirrhosis.
- D. Metastases may originate from gastric adenocarcinoma.
- E. With a solitary metastatic nodule from colon cancer, surgery may still be curative.

A. Carcinoembryonic antigen is elevated in patients with GIT and breast cancer. The tumour marker of HCC is alpha fetoprotein.

While metastases have the largest share of all liver malignancies, HCC is the commonest primary malignancy. In the majority of cases it arises on top of liver cirrhosis, particularly that following infection with viral hepatitis B and C.

Only for colorectal cancer a solitary metastatic nodule (or nodules that are localised to one lobe), surgery may still be curative provided that the primary lesion is resectable with a safety margin.

24. All the following about hepatocellular carcinoma (HCC) are true, except:

- 1. The majority of HCCs occur on top of a previously unhealthy liver.
- 2. It may be multicentric.
- 3. The blood supply of HCC is derived from the portal vein.
- 4. On a triphasic CT scan HCC shows hypervascularity.
- 5. In the presence of characteristic CT features of HCC and markedly elevated alpha fetoprotein, there is no need for liver biopsy.

C. The blood supply of HCC is the hepatic artery rather than the portal vein. This fact is made use of for its treatment. One of the treatment modalities of advanced cases is to embolise the branch of hepatic artery that supplies the tumour. Tumour necrosis occurs while the surrounding healthy liver is relatively spared as it has additional blood supply; the portal circulation.

The hypervascularity of HCC on CT differentiates it from a metastatic nodule, which is hypovascular.

25. All the following are methods of treatment of HCC, except:

- A. Radiotherapy.
- B. Liver resection.
- C. Selective chemotherapy.
- D. Embolisation.
- E. Percutaneous radiofrequency ablation.

A. HCC is radioresistant.

26. Liver metastases are commonly caused by any of the following primary cancers, except

- A. Colon.
- B. Testis.
- C. Pancreas.
- D. Stomach.
- E. Rectum.

B. Venous drainage of the testis is systemic. Haematogenous spread of testicular cancer goes to the lungs rather than the liver.

For the other above-mentioned organs venous drainage is portal. The liver is the first filter that meets their malignant cells if they get into the circulation.

Choose the single best answer

1. Regarding biliary anatomy, all the following statements are true, except:

- A. The right and left hepatic ducts meet to make the common bile duct.
- B. The cystic duct meets the common hepatic duct to form the common bile duct.
- C. The common bile duct usually joins the main pancreatic duct before opening in the duodenum.
- D. The cystic artery usually arises from the left hepatic artery.
- E. The venous drainage of the gall bladder is portal.

D. The cystic artery usually arises from the right hepatic artery.

The venous drainage of the gall bladder goes to the portal circulation. In cases of portal hypertension the gall bladder is expected to be surrounded by extensive venous collaterals. Cholecystectomy becomes more difficult and more hazardous.

2. About biliary physiology, all the following statements are true, except:

- A. The gall bladder secretes bile salts.
- B. Cholesterol is dissolved in bile by the effects of bile salts and phospholipids.
- C. The ingestion of fat stimulates gall bladder contraction.
- D. Bilirubin in the bile ducts is of the conjugated type.
- E. The yellow colour of bile is caused by the presence of bilirubin.

A. All bile components are secreted by the liver cells. The gall bladder concentrates and stores bile. With the intake of food, particularly fatty food, the gall bladder contracts to push its concentrated bile content into the duodenum. Bile salts act as emulsifiers that make fat soluble in water, rendering it ready for digestion.

Cholesterol is dissolved in bile by the effects of bile salts and phospholipids. If the ratio of cholesterol/solvents rises (increased cholesterol content or reduced bile salt content) cholesterol becomes less soluble in bile and its crystals start depositing in the gall bladder to start making stones.

3. About imaging of the biliary system, one statement only is true:

- A. The majority of gall bladder stones show on plain X-ray.
- B. The majority of bile duct stones show on plain X-ray.
- C. Oral cholecystography is the standard imaging study for detecting gall bladder stones.
- D. Ultrasound can see the majority of common bile duct stones.
- E. The visualisation of air in the bile ducts on plain X-ray may be caused by a bilio-enteric fistula.

E. The ratio of radio-opaque / radiolucent gall stones is $\approx 15/85$. Only 15% contain enough calcium to show on a plain X-ray. This is the inverse ratio for urinary stones where $\approx 15\%$ are radiolucent and $\approx 85\%$ are radio-opaque.

gall duct stones have the same composition as gall bladder stones. Furthermore, most of duct stones have their origin in the gall bladder and migrate through the cystic duct to the common bile duct.

Oral cholecystography is seldom, if ever, used in modern surgical practice. This is because ultrasonography can detect the great majority of gall bladder stones (~98%), is a simple, inexpensive and safe study that is widely available. Ultrasonography, however, can see only about one third of common bile duct stones. This is because most of them will be concealed behind air in the duodenum (air is the enemy of sonography). Inability to see the duct stones is partially compensated by detecting their effects: that is duct dilatation if a stone is distally obstructing.

4. About ERCP, all the following statements are true, except:
- A. ERCP is a useful study for visualization of the pancreatic duct in cases of chronic pancreatitis.
 - B. ERCP is needed for the diagnosis of acute pancreatitis.
 - C. ERCP is useful in delineating iatrogenic bile duct injuries.
 - D. ERCP is useful in the diagnosis of bile duct stones.
 - E. ERCP can remove bile duct stones.

5. The diagnosis of acute pancreatitis is clinical, laboratory and CT-based. ERCP is used for a few selected cases of acute pancreatitis, not for diagnosis, but for removal of impacted stones in the lower end of the common bile duct.

6. The possible complications of ERCP include all the following, except:
- A. Acute pancreatitis.
 - B. Acute cholangitis.
 - C. Perforation of the gall bladder.
 - D. Perforation of the duodenum.
 - E. Bleeding.

7. The gall bladder is not in the pathway of the endoscope nor the instruments that are used for stone extraction (electrocautery, guide wire, basket, ...).

An ERCP procedure that fails to resolve bile duct obstruction is particularly liable to cause acute cholangitis. Manipulations can introduce bacteria into the still-obstructed bile ducts. A combination of infection and obstruction is very dangerous as the cholangitis will rapidly progress to liver abscesses and to septicaemia. The situation is comparable to that of the urinary tract where a combination of obstruction and infection is very harmful to kidney function, causes severe pyelonephritis and pyonephrosis, and also causes septicaemia. Bleeding is likely to occur at papillotomy, particularly if hypoprothrombinaemia of obstructive jaundice is not corrected.

8. The best imaging study for suspected gall bladder stones is:
- A. Plain X-ray of abdomen.
 - B. Oral cholecystography.
 - C. Abdominal ultrasound.
 - D. Magnetic resonance imaging of abdomen.

E. Isotope scan.

C. Ultrasonography can detect the great majority of gall bladder stones (~95%) is a simple inexpensive and safe study that is widely available.

7. Regarding biliary stones:

- A. A stone in the gall bladder causes acute pancreatitis.
- B. The commonest is the mixed type.
- C. The majority are radio-opaque.
- D. Gall bladder stones always cause abdominal pain.
- E. The first line treatment is ESWL.

B. Stones in the gall bladder do not cause pancreatitis. A stone in the common bile duct can do this if impacted in the lower end or when it passes through it to the duodenum.

The majority of gall bladder stones are asymptomatic.

Extracorporeal shock wave lithotripsy, which is widely used to treat renal stones, is not suitable for gall stones. For one reason fragmentation of the stone is not easy. The stone, when hit by the shock wave, bounces to and fro in the capacious gall bladder. This is in contrast to the confined space of the renal pelvis. More important, if ESWL succeeds in fragmenting a gall bladder stone, the fragments can easily migrate to the common bile duct. Duct stones are far more serious than gall bladder stones. They are likely to cause obstructive jaundice, acute cholangitis and acute pancreatitis. Any of these complications can be fatal.

8. All the following factors increase the possibility of gall stone formation, except:

- A. Hypertension.
- B. Female hormones.
- C. Hyperlipidaemia.
- D. Obesity.
- E. Haemolytic blood diseases.

A. Females are more likely to have gall stones than males. The risk rises with repeated pregnancies and with the use of contraceptive pills. This is because female hormones produce some stasis of bile.

Obese people are likely to have hypercholesterolaemia and to have more cholesterol in bile. Haemolytic blood diseases result in excess bile pigment secretion in bile, and hence, to higher incidence of pigment stones.

9. Most of gall bladder stones:

- A. Are asymptomatic.
- B. Cause biliary colic.
- C. Cause obstructive jaundice.
- D. Cause acute cholecystitis.
- E. Cause acute pancreatitis.

A. Most of gall bladder stones are silent, i.e., cause no symptoms. They go undiscovered or are accidentally discovered on ultrasound examination that is being done for some other reason.

10. About common bile duct stones, all the following statements are true, except:
- Bile duct stones are more serious than gall bladder stones.
 - Bile duct stones are present in 10-15% of patients with gall bladder stones.
 - Calcular obstructive jaundice is usually intermittent.
 - Bile duct stones that migrate to the intestine may cause gall stone ileus.
 - Common bile duct stones are commonly missed on ultrasound examination.

D. Gall stone ileus has no relationship to paralytic ileus. It is actually a form of mechanical intestinal obstruction. A big gall bladder stone (>2.5cm) finds its way to the duodenum, passes down with peristalsis to obstruct the distal ileum, which is the narrowest part of the intestine. For a bile duct stone to pass to the duodenum it should be smaller than the opening at the duodenal papilla, i.e., ≤ 3 mm. This stone is too small to obstruct the intestine. For a big stone to pass to the duodenum it should do so through a large-size cholecysto-duodenal fistula.

11. About mixed gall stones all the following statements are true, except:
- They form the commonest type of gall bladder stones.
 - Usually a solitary mixed stone is present in the gall bladder.
 - They are usually faceted.
 - Their calcium content may make them opaque on plain X-ray.
 - They contain cholesterol.

B. The mixed type accounts for 90% of all gall stones. They are usually multiple, yellowish, faceted (because of mutual compression) and contain more than 60% of their weight cholesterol. In addition they include calcium and may, thus, be radio-opaque.

12. Precipitation of cholesterol to form gall stones is caused by all the following, except:
- Resection of terminal ileum.
 - Left colectomy.
 - Crohn's disease.
 - Repeated pregnancies.
 - Contraceptive pills.

B. Resection of terminal ileum and Crohn's disease interfere with bile salt absorption, which mainly occurs from the terminal ileum. Reduction of bile salt pool, and consequent reduction of its content in bile, reduce solubility of cholesterol. Repeated pregnancies and the use of contraceptive pills raise the level of female hormones, which cause some bile stasis. Colectomy has no relationship with gall stone formation.

13. All the following features are characteristic of biliary colic, except:
- Is commonly induced by large or fatty meals.
 - Pain is epigastric and right hypochondrial.

- C. Pain radiates to the back on the right side.
- D. Commonly accompanied with nausea and vomiting.
- E. Usually accompanied with fever and leucocytosis.

E. Fever, leucocytosis and positive Murphy's are features of acute cholecystitis rather than biliary colic. It should be remembered, however, that obstruction of the gall bladder neck by a stone causes biliary colic. If this is not relieved, it is likely to proceed to acute cholecystitis.

14. The standard treatment of bile duct stricture after cholecystectomy is:
- A. ERCP and stenting.
 - B. Percutaneous transhepatic drainage of bile.
 - C. Hepaticojejunostomy.
 - D. Choledochoduodenostomy.
 - E. Open drainage of bile by a T-tube.

C. An iatrogenic stricture is usually higher than expected, commonly in the common hepatic duct or at the confluence of the right and left hepatic ducts. The standard treatment is to anastomose a healthy hepatic duct (above the stricture) to a loop of jejunum.

15. The standard treatment of symptomatic gall bladder stones is:
- A. Low-fat diet.
 - B. Dissolution of stones with oral bile salts.
 - C. Surgical removal of the gall bladder.
 - D. Surgical removal of the stones, leaving the gall bladder in place.
 - E. Fragmenting the stones with extracorporeal shock wave lithotripsy.

C. Cholecystectomy is the standard treatment. The operation removes the gall bladder with its contained stones. Removing the stones only leaves an unhealthy gall bladder that is liable to reform stones. This policy is seldom followed and is called cholecystostomy. The only indication is at surgery for acute cholecystitis if the adhesions make removal of the gall bladder likely to cause serious injuries and bleeding. In this case the stones are removed through an opening in the fundus and the gall bladder is drained by a tube to the outside. However, the ultimate treatment is cholecystectomy that will be done at a later date when the local conditions become more favourable.

16. In a patient with gall bladder stones, all the following findings raise suspicion of bile duct stones, except:

- A. History of jaundice.
- B. Biliary pain that is accompanied with fever and rigors.
- C. Dark yellow urine.
- D. Raised serum alkaline phosphatase.
- E. Ultrasound finding of a bile duct whose diameter is more than 8mm.

C. Dark yellow urine means that it is concentrated. The presence of bilirubin in urine adds a reddish hue to it. With obstructive jaundice urine becomes tea coloured.

17. Cholecystectomy is advised in the following situations, except:

- A. Silent gall stones in a diabetic patient.
- B. Gall bladder stones that cause recurrent biliary colic.
- C. Acute cholecystitis in the first 3 days of the attack.
- D. Acute cholecystitis during the second week after the start of the attack.
- E. Gall bladder cancer.

D. The presence of diabetes favours cholecystectomy, even if the stones are silent. This is because of the high risk if the patient develops acute cholecystitis. Acute cholecystitis in diabetics is known to proceed rapidly to gangrene of the gall bladder.

Recurrent biliary colic is the commonest indication for cholecystectomy.

In the first three days of acute cholecystitis, removal of the gall bladder is still technically easy.

After a few more days vascular adhesions form and make the operation technically difficult.

Therefore, for acute cholecystitis the best time for cholecystectomy is either the first three days or after six weeks of the attack when the local inflammatory process settles down.

18. A stone in the common bile duct can cause any of the following complications, except:

- A. Obstructive jaundice.
- B. Bile duct cancer.
- C. Acute pancreatitis.
- D. Acute cholangitis.
- E. Cholangitic abscesses of the liver.

B. While a stone in the gall bladder predisposes to gall bladder cancer, a bile duct stone is not known to be precancerous. It should be noted that the complications of bile duct stones are very serious and may be rapidly fatal.

19. About biliary isotope scan, all the following statements are true, except:

- A. It is called HIDA scan.
- B. It is useful in patients with acute cholecystitis.
- C. It is useful in the diagnosis of biliary atresia.
- D. The used material is technetium.
- E. It is indicated for diagnosis of the cause of obstructive jaundice.

E. For HIDA scan ^{99m}Tc is administered IV. The isotope is secreted by the liver, and is then excreted along the biliary pathway. Normally it is concentrated in the gall bladder. If the common bile duct is visualized while the gall bladder is not seen, this is diagnostic of acute cholecystitis.

Its other two indications are diagnosis of biliary atresia and visualization of biliary enteric anastomosis.

20. The specific risks of operating on a patient with obstructive jaundice include all the following, except:

- A. Bleeding.

- B. Septicaemia.
- C. Liver failure.
- D. Renal failure.
- E. Deep vein thrombosis.

E. DVT has other specific risk factors.

Bleeding tendency is caused by the inability of bile salts to reach the intestine. This results in defective absorption of fat-soluble vitamins; one of them is vitamin K. In turn, deficiency of vitamin K causes deficiency of prothrombin formation in the liver. Hypoprothrombinaemia impairs coagulation.

The presence of bile salts in the intestine prevents migration of intestinal bacteria to the blood stream. In a patient with obstructive jaundice the absence of bile salts in the intestine predisposes to bacterial migration and the development of septicaemia. Add to this is the possibility of infection of the biliary tree (cholangitis).

Septicaemia can lead to renal failure and to failure of the already suffering liver.

21. Preoperative preparation of an obstructive jaundice patient includes all the following, except:

- A. Vitamin K tablets.
- B. IV fresh frozen plasma.
- C. Parenteral antibiotics.
- D. Oral and IV fluid administration.
- E. High sugar intake.

A. In an obstructive-jaundice patient Vitamin K should be given parenterally, preferably by the IV route. Its oral intake is ineffective because it will not be absorbed from the intestine in the absence of bile salts.

The administration of fresh-frozen plasma (FFP) corrects the deficiency of prothrombin and other coagulation factors.

Parenteral antibiotics guard against infection of the obstructed biliary tree, and help the treatment of established cholangitis.

Fluid intake adds protection against renal failure, and so does the IV administration of mannitol. High sugar intake is transformed into glycogen stores in the liver. This improves resistance of the liver to injurious agent.

22. Regarding T-tube cholangiography, all the following statements are true, except:

- A. A T-tube is placed in the common bile duct after its exploration.
- B. A normal cholangiogram shows free flow of contrast to the duodenum.
- C. A normal cholangiogram shows no filling defects in the CBD.
- D. The T-tube is removed two days after its placement at surgery.
- E. T-tube removal is a bed-side procedure.

D. A T-tube is placed in the common bile duct after its exploration to remove stones. The T-tube cholangiogram is intended to look for missed bile duct stones. The tube should be retained for at least one week in order to allow the formation of a track around it. If the cholangiogram shows

no residual stones the tube is pulled out at bed side. A few drops of bile will trickle out through the formed track, but will dry up within two days as long as there is no biliary obstruction.

23. About bile duct cholangiocarcinoma, all the following statements are true, except:

- A. Choledochal cyst predisposes to cholangiocarcinoma.
- B. The possible extra-colonic complications of ulcerative colitis include cholangiocarcinoma.
- C. Bile duct infestation with the *Ascaris* parasite predisposes to cholangiocarcinoma.
- D. Hilar (at liver hilum) cholangiocarcinoma is known as Klatskin tumour.
- E. Percutaneous transhepatic cholangiography (PTC) is useful in showing the upper limit of the tumour.

*C. *Ascaris lumbricoides* is an intestinal parasite that has been found in the bile duct in rare cases. It is not related to cholangiocarcinoma. The parasite that causes this neoplasm is called *Clonorchis sinensis*, which is present in Southeast Asia.*

24. About jaundice, all the following statements are true, except:

- A. Jaundice that is caused by haemolytic diseases is characterized by "no bilirubin in urine".
- B. In obstructive jaundice bile salt retention causes itching.
- C. Cancer of head of pancreas causes progressive jaundice.
- D. CT is the first-choice imaging study for obstructive jaundice.
- E. In obstructive jaundice defective intestinal absorption of vitamin K causes hypoprothrombinaemia.

D. The course of jaundice is an important indicator of its cause. Progressive deepening of jaundice and of urine colour suggest malignant obstruction. On the other hand an intermittent course is suggestive of calculous obstruction.

Ultrasound is the first-choice imaging study for obstructive jaundice. This is a simple study that is widely available, safe and inexpensive. Ultrasound proves the presence of biliary obstruction and its level by displaying proximal dilatation. It can sometimes diagnose its cause.

The choice of the next imaging study depends on the suspected diagnosis. If pancreatic head cancer is the likely diagnosis it will be CT scan with oral and IV contrasts. If calculous obstruction is suspected ERCP is the choice.

25. About laparoscopic cholecystectomy, all the following statements are true, except:

- A. The operation is conducted under general anaesthesia.
- B. The operation is conducted through four small incisions.
- C. It is more suitable for patients with bleeding tendencies.
- D. Postoperative pain is less than open cholecystectomy.
- E. Bile duct injuries can still occur with laparoscopic cholecystectomy.

C. The presence of bleeding tendency favours open surgery. This is because control of bleeding is easier when the surgeon uses his/her hands directly on the tissues. Furthermore laparoscopic visualization is seriously impaired in the presence of bleeding.

26. Iatrogenic bile duct injuries cause all the following, except:

- A. Excess bile discharge through the drain.
- B. Hypovolaemic shock.
- C. Biliary peritonitis.
- D. Biliary fistula.
- E. Obstructive jaundice.

B. Partial or complete division of the common hepatic or common bile duct causes excess discharge through the drain, biliary peritonitis or biliary fistula. Ligation or clipping of these ducts causes obstructive jaundice. These injuries are not known to cause serious bleeding.

Choose the single best answer

1. About anatomy of the pancreas, all the following statements are true, except:
- It receives blood supply from the coeliac trunk and from the superior mesenteric artery.
 - The pancreatic body and tail are supplied by the splenic artery.
 - The superior pancreaticoduodenal artery is a branch of Superior mesenteric artery.
 - The lower end of the common bile duct is embedded in the head of the pancreas.
 - The superior mesenteric vessels pass in front of the uncinate process.

C. The head of the pancreas is supplied by the superior and the inferior pancreaticoduodenal arteries. Its body and tail are supplied by the splenic artery. The superior pancreaticoduodenal artery is one of the two terminal branches of the gastroduodenal artery, which is a branch of the common hepatic, i.e., its origin is from the coeliac trunk.

The inferior pancreaticoduodenal artery is a branch of the superior mesenteric artery. The splenic artery is a direct branch of the coeliac trunk.

The presence of the lower end of the common bile duct within the pancreatic head has an important clinical bearing. Carcinoma of the head infiltrates the duct and causes obstructive jaundice.

2. About anatomical relations of the pancreas, all the following statements are true, except:
- The lesser sac separates the pancreas from the posterior surface of the stomach.
 - The inferior vena cava lies posterior to the head of the pancreas.
 - The portal vein is formed behind the neck of the pancreas.
 - The abdominal aorta lies posterior to the body of the pancreas.
 - The splenic artery runs horizontally posterior to the body and tail of the pancreas.

E. The lesser sac is the place where the exudate of pancreatitis accumulates to form a pseudocyst.

The portal vein is formed by the confluence of the superior mesenteric and the splenic veins behind the neck of the pancreas. Passage of the surgeon's fingers to find a dissection plane between these veins and the neck of the pancreas is the decisive factor that judges feasibility of radical resection of pancreatic head cancer; Whipple's operation.

It is, actually the splenic vein that runs horizontally behind the body of the pancreas. The splenic artery lies parallel to the vein but at a higher level. It is a tortuous artery that is found just above the upper border of the pancreas.

3. About pancreatic physiology, all the following statements are true, except:
- The islets of Langerhans are concentrated in the left half of the pancreas.

- B. The protein-digesting enzymes of the pancreas are normally activated in the intestine.
- C. Beta cells secrete insulin.
- D. Alpha cells secrete gastrin.
- E. The pancreas secretes amylase and lipase.

D. The pancreas secretes trypsinogen and chymotrypsinogen that are normally activated in the intestine. Their premature activation, while still in the pancreas initiates autodigestion, which starts acute pancreatitis.

Alpha-cells secrete glucagon. G cells that secrete gastrin are present in the gastric antral mucosa and are normally not present in the pancreas. They appear there in the rare Zollinger Ellison syndrome.

The pancreas also secretes amylase and lipase, which digest carbohydrates and fats, respectively. Acute pancreatitis is associated with marked elevation of their serum and urinary levels; a fact that is used in diagnosis of this condition.

4. The commonest cause of acute pancreatitis is:

- A. Biliary stones.
- B. Excess alcohol consumption.
- C. Hyperlipidaemia.
- D. Steroid therapy.
- E. Hyperparathyroidism.

A. The commonest cause is biliary stone disease. An impacted stone in the ampulla of Vater, or even the mere passage of a stone through it, may lead to regurgitation of bile into the pancreatic duct leading to premature activation of pancreatic proteolytic enzymes. This starts a process of autodigestion of the pancreas.

Excess alcohol consumption is the next common cause.

Trauma, particularly that is related to ERCP, is the third commonest cause of acute pancreatitis. Other causes are rare.

5. All the following are causes of acute pancreatitis, except:

- A. Hypercalcaemia.
- B. Hypokalaemia.
- C. Hyperlipidaemia.
- D. Common bile duct stone.
- E. Thiazide diuretics.

B. Neither hypo- nor hyperkalaemia are known to cause pancreatitis.

6. The following are all features of acute pancreatitis, except:

- A. Severe epigastric pain.
- B. Vomiting.
- C. Shock.
- D. Severe epigastric tenderness.

E. Markedly elevated serum amylase.

D. A characteristic feature of acute pancreatitis is that pain is severe while tenderness is mild. This is explained by the fact that the pancreas is a retroperitoneal organ whose inflammation causes little irritation to the sensitive anterior parietal peritoneum. Shock is a feature of severe acute pancreatitis because there is transperitoneal loss of a large volume of protein-rich exudates.

7. The commonest cause of death during the first week of acute pancreatitis is:

- Haemorrhagic shock.
- Multiple organ failure.
- Ruptures splenic artery aneurysm.
- Pancreatic abscess.
- Pulmonary embolism.

B. Multiple organ failure, particularly ARDS, is the cause of death in the early phase (7 days). Infective complications are the cause of death in the late phase.

8. About acute pancreatitis, all the following statements are true, except:

- The aim of assessing severity is to select patients who require admission to the intensive care unit.
- Urgent laparotomy is indicated for severe acute pancreatitis.
- Age above 55 years is considered a bad prognostic factor.
- Hypocalcaemia is considered a bad prognostic factor.
- Obesity is considered a bad prognostic factor.

B. The severity of acute pancreatitis does not decide the need for surgery.

Treatment of acute pancreatitis is essentially conservative. The indications for surgery are limited and include:

- *Doubtful diagnosis where other causes of acute abdomen cannot be excluded. Examples include suspicion of acute intestinal ischaemia and perforated duodenal ulcer. A laparotomy for acute pancreatitis does not worsen the prognosis.*
- *Necrotising pancreatitis in order to remove the necrotic tissue.*
- *Drainage of a pancreatic abscess, or of a persistent pseudocyst that does not resolve in six weeks.*

9. About conservative treatment of acute pancreatitis, all the following statements are true, except:

- Severe acute pancreatitis cases require treatment in an intensive care unit.
- Circulatory support may require blood transfusion.
- Mechanical ventilation is indicated when arterial PO_2 is less than 50 mmHg.
- IV antibiotics may reduce infection of necrotic pancreatic tissue.
- ERCP for sphincterotomy and for removal of bile duct stones is indicated for all cases.

E. Blood transfusion is required in haemorrhagic pancreatitis cases. The need for this transfusion depends on serial haemoglobin and haematocrit estimations. Arterial PO_2 that is less than 60mmHg indicates respiratory failure and, thus, requires endotracheal intubation and mechanical ventilation. ERCP is indicated only if there is evidence of stone impaction in the lower end of the common bile duct, e.g., obstructive jaundice.

10. About pancreatic pseudocyst, all the following statements are true, except:

- A. It may be painless.
- B. A large cyst is felt in the epigastrium.
- C. It shows transmitted pulsations.
- D. The best imaging study for its diagnosis is barium meal.
- E. Surgery is done for cysts that persist for more than six weeks.

D. A pancreatic pseudocyst is commonly painless. If large it can cause mild upper abdominal pain and forms a palpable mass in the epigastrium that exhibits transmitted pulsations from the abdominal aorta.

The best imaging studies are ultrasound and CT scan.

Waiting for six weeks is important to ensure that the cyst is not resolving spontaneously, and to allow the development of a strong cyst wall that can hold sutures. The cyst is internally drained to the stomach (cysto-gastrostomy) or to a jejunal loop (cystojejunostomy).

11. Complications of acute pancreatitis include all the following, except:

- A. Respiratory failure.
- B. Renal failure.
- C. Hypercalcaemia.
- D. Pancreatic pseudocyst.
- E. Pancreatic abscess.

C. Major surgery, major trauma, shock (particularly septic shock), major burns and acute pancreatitis can all cause multiple organ failure if not properly managed. The system failures include respiratory failure, circulatory failure (shock), renal failure, coagulation failure (DIC), gastroduodenal mucosal failure (stress ulcers), and gut barrier failure (translocation of bacteria). The enzyme lipase which is released from the pancreas splits fat in the omentum and peritoneum producing glycerol and fatty acids. These acids bind with calcium forming insoluble calcium soap which manifests as white spots of fat necrosis. In severe cases binding with calcium is likely to produce hypo- rather than hypercalcaemia.

12. About the diagnosis of acute pancreatitis, all the following statements are true, except:

- A. Serum amylase is markedly elevated during the first week of the attack.
- B. Low arterial PO_2 is expected in severe cases.
- C. Hypoproteinaemia is expected in severe cases.
- D. A dilated common bile duct on ultrasound examination suggests a stone impaction in its lower end.

E. CT scan with IV contrast can help staging the severity of the disease.

A. Serum amylase is usually elevated within a few hours to levels higher than 1000 IU/dL (normal value is 100-300 IU/dL). It remains elevated for 2-3 days only. The problem with serum amylase is that it is not specific for acute pancreatitis. It is elevated in other conditions as perforated peptic ulcer, acute cholecystitis, intestinal obstruction and acute mesenteric ischaemia. The enzyme level in these cases, however, usually does not exceed 500 IU/dL. Pancreatic necrosis is diagnosed when a big part of the parenchyma is not enhanced after IV contrast injection. The presence of necrosis is a strong indicator of severity of the attack. A CT scan should be performed at least 48 h after the onset of symptoms in order to detect the extent of necrosis.

13. About chronic pancreatitis, all the following statements are true, except:

- A. The commonest cause is bile duct stones.
- B. The disease is characterised by fibrosis of the pancreas.
- C. The disease is characterised by progressive loss of exocrine function.
- D. The disease is characterised by progressive loss of endocrine function.
- E. Pancreatic pathology is irreversible.

A. The commonest cause of chronic pancreatitis is alcohol abuse.

14. The pancreatic pseudocyst is so called because:

- A. It has no epithelial lining.
- B. It may contain necrotic material.
- C. It is not embedded in the pancreas.
- D. It may be caused by diseases of organs other than the pancreas.
- E. It is, in fact, a neoplasm.

A. It is called a pseudocyst (false cyst) because it has no epithelial lining. It is actually lined by granulation tissue.

This pseudocyst is caused by acute pancreatitis, chronic pancreatitis or pancreatic injury. It is not neoplastic.

15. About clinical features of chronic pancreatitis, all the following statements are true, except:

- A. Chronic abdominal pain is the main symptom.
- B. The disease can cause chronic constipation.
- C. The disease can cause loss of weight.
- D. The disease can cause diabetes mellitus.
- E. The disease may cause obstructive jaundice.

B. Pain is the main symptom. It is classically in the epigastrium and radiates to the back. It may be mild or severe, and continuous or interrupted. Pain commonly causes drug addiction for analgesics.

Malabsorption from loss of enzymes produces steatorrhea (fatty diarrhoea) in one third of cases, together with loss of weight, and weakness. Stools typically are soft, greasy, and foul smelling.

Diabetes mellitus develops with extensive damage of the pancreas. It occurs in one third of patients.

Rarely, fibrosis in the head of the pancreas can cause narrowing of the lower end of the common bile duct, and consequently obstructive jaundice. It is, sometimes difficult to differentiate from malignancy.

16. About management of chronic pancreatitis, all the following statements are true, except:

- Faecal fat estimation can assess exocrine function of the pancreas.
- Secretin stimulation test can assess exocrine function of the pancreas.
- Surgery is required for the majority of chronic pancreatitis patients.
- ERCP is done if surgery is indicated.
- Pancreatico-jejunostomy is feasible only if part of the pancreatic duct is dilated.

C. Treatment of chronic pancreatitis is essentially conservative by:

- Non-addicting analgesics.
- Oral administration of pancreatic enzymes and a low-fat diet.
- Insulin for diabetes control.

Surgery is required for persistent uncontrollable pain. ERCP is required only if surgery is decided upon. It shows a map of the pancreatic duct. If part of the duct is dilated it can be drained by pancreatico-jejunostomy. If none is present, the part of the pancreas that is severely damaged is excised.

17. The most common site for carcinoma of the pancreas is the:

- Head.
- Neck.
- Body.
- Tail.
- Diffuse.

A. 60% of pancreatic cancers are present in the head.

18. About spread of pancreatic head cancer, all the following statements are true, except:

- Invasion of the common bile duct causes obstructive jaundice.
- Direct infiltration of the superior mesenteric artery indicates inoperability.
- Lymphatic spread can reach lymph nodes along the hepatic artery.
- The first station for haematogenous spread is the lungs.
- Transperitoneal spread can cause peritoneal nodules and ascites.

D. The first station for haematogenous spread is the liver because the pancreatic veins are part of the portal circulation.

19. Cancer of the head of the pancreas has the following clinical features, except:
- A. Progressive jaundice.
 - B. Severe abdominal pain.
 - C. Tea-coloured urine.
 - D. Itching.
 - E. Usually a palpably distended gall bladder.

B. Infiltration of the bile duct causes obstructive jaundice with reddish discoloration of urine and clay coloured stools. Retention of bile salts causes itching, which is commonly the most troubling symptom. As any cancer the symptoms are progressive.

Malignant obstructive jaundice may be painless or at most can cause mild abdominal pain.

A healthy gall bladder is distensible. Obstruction to the flow of bile causes marked distension of the gall bladder.

On the other hand, calculi obstructive jaundice is intermittent, causes severe pain and the gall bladder is usually impalpable as it is chronically inflamed and is stiff because of fibrosis.

20. About the diagnosis of suspected carcinoma of the head of pancreas, all the following statements are true, except:

- A. The tumour marker of pancreatic cancer is CA 19-9.
- B. Triphasic CT scan shows the cancer as an enhancing lesion.
- C. Ultrasound of the abdomen is less likely to see the tumour than CT scan.
- D. Ultrasound of the abdomen shows dilatation of the intra- and extra-hepatic bile ducts.
- E. Alkaline phosphatase is expected to be elevated.

B. Both CA 19-9 and CEA are likely to be elevated with pancreatic adenocarcinoma. However, CA 19-9 is more specific.

Ultrasound is the first imaging study in cases of obstructive jaundice. It shows dilatation of all bile ducts but is less likely to see the tumour than CT scan.

CT is the ideal imaging study if obstructive jaundice is suspected to be malignant. An ideal CT scan should be triphasic and spiral with thin cuts (3mm) in order to detect small lesions.

Classically the tumour looks hypodense, i.e., shows no enhancement with the contrast.

21. With operations for obstructive jaundice the patients are particularly prone to develop any of the following complications, except:

- A. Pulmonary embolism.
- B. Excessive bleeding.
- C. Septicaemia.
- D. Postoperative renal failure.
- E. Postoperative liver failure.

A. Obstructive jaundice patients have bleeding tendency because of hypoprothrombinaemia. These patients are less prone to have DVT and pulmonary embolism than the rest of surgical patients.

22. Regarding treatment of pancreatic head cancer, all the following statements are true, except:

- A. For an irresectable tumour the best treatment is radiotherapy.
- B. A pancreaticoduodenectomy operation is indicated for early cases.
- C. In a Whipple's operation the superior mesenteric vessels are spared.
- D. By the end of a Whipple's operation there are gastrojejunal, hepaticojejunal and pancreaticojejunal anastomoses.
- E. For patients who are not fit for anaesthesia endoscopic stenting is indicated.

A. Pancreatic cancer is adenocarcinoma, which is known to be relatively radio-resistant. If at operation the tumour is found irresectable, the preferred treatment is to do internal drainage of bile to the jejunum, e.g., by cholecysto-jejunostomy.
The superior mesenteric vessels are indispensable for the viability of the whole midgut. Sacrificing these vessels causes extensive gangrene that is incompatible with life.

23. Regarding prognosis of exocrine adenocarcinoma of the pancreas, all the following statements are true, except:

- A. Carcinoma of the head carries a better prognosis than carcinoma of the body of pancreas.
- B. Periapillary carcinoma carries a better prognosis than carcinoma of the head proper.
- C. At laparotomy for head cancer, early cases that are suitable for pancreaticoduodenectomy represent 10-15% only of the total.
- D. Invasion of the portal vein worsens the prognosis.
- E. Pancreatico-duodenectomy is a minor palliative operation that has less than 1% operative mortality.

E. Cancers of the body and tail have worse prognosis than those of the head because they tend to be discovered at an advanced stage as they cause vague symptoms of ill health. Cancer of the head causes obstructive jaundice that alerts the patient to seek medical help. A periapillary cancer causes obstructive jaundice while still very small. This is why it has a better prognosis than cancer of the head proper.
Pancreaticoduodenectomy (Whipple's operation) is a very major operation that has a high operative mortality of about 10%. It entails removal of the pancreatic head, the duodenum $\pm$ the distal part of the stomach.

24. About insulinomas, all the following statements are true, except:

- A. It arises from the beta cells of islets of Langerhans.
- B. It usually arises from the head of pancreas.
- C. It is usually benign.
- D. It gives symptoms of hypoglycaemia.

E. The best treatment is surgical resection.

8. The islets of Langerhans are concentrated towards the tail of the pancreas. Because of hypoglycaemia, patients tend to over-eat and to become obese. The best treatment is resection, but the challenge is adequate preoperative and intra-operative localisation of the tumour.

25. About Zollinger Ellison syndrome, all the following statements are true, except:

- A. It may be part of type II of multiple endocrine neoplasia (MEN) syndrome.
- B. Hypergastrinaemia causes intractable peptic ulcerations.
- C. The majority of the gastrinomas are malignant.
- D. Diarrhoea is present in 30% of cases.
- E. If tumour resection is not possible, an alternative is to do total gastrectomy.

A. It may be an isolated tumour or is a part of MEN syndrome type I.

Sixty percent are malignant.

Total gastrectomy is an effective alternative as it eliminates the source of acid secretion.

Choose the single best answer

1. The commonest position of the appendix is:

- A. Pelvic.
- B. Pre-ileal.
- C. Post-ileal.
- D. Retrocaecal.
- E. Para-caecal.

D. The relation of the appendix to the caecum is variable. The commonest position of the appendix is retrocaecal (74%), and the second common is the pelvic position (21%). Less common are the para-caecal (2%), the sub-caecal (1.5%), pre-ileal (1%) and least of all positions is the post-ileal appendix (0.5%).

2. About anatomy of the appendix, all the following statements are true, except:

- A. The appendicular artery is derived from the ileocolic artery.
- B. The appendicular artery reaches the appendix through the mesoappendix.
- C. The appendix vein is portal.
- D. The base of the appendix lies at the point of confluence of the taenia coli.
- E. The appendix wall is devoid of lymphoid tissues.

E. The appendix has a profuse blood supply by one or two appendicular arteries arising from the ileocolic artery or its posterior caecal branch.

At operation, the base of the appendix is found by tracing any of the taenia coli of the caecum. The lumen of the appendix is irregular and narrow due to abundance of lymphoid follicles in the submucosa. Swelling of the lymphoid tissue in response to viral infection cause obstruction of its lumen and can start the process of acute appendicitis. This lymphoid tissue progressively atrophies with age.

3. About acute appendicitis, all the following statements are true, except:

- A. Acute appendicitis is the most common acute abdominal surgical emergency.
- B. Acute appendicitis is most prevalent at the extremes of age.
- C. In the majority of cases inflammation is initiated by obstruction of the appendix.
- D. Inflammation starts in the mucosa.
- E. Obstructive appendicitis is more likely to perforate than the non-obstructive type.

B. Acute appendicitis is most prevalent in the second and third decades of life, after which the risk declines with age. Since the appendix of the infant is wide-mouthed and well drained, and since in the elderly the lumen is almost obliterated, and the wall contains little lymphoid tissue, appendicitis in the two extremes of life is unusual.

The appendix may be obstructed by a faecolith (dried faecal material), hyperplastic lymphoid follicles, tumour or by parasites.

The inflammatory manifestations of acute appendicitis start in the mucosa then spread outwards. In early catarrhal appendicitis these manifestations may not show on the serosal surface. In obstructive appendicitis the inflammatory process is rapid and tends to be suppurative or gangrenous.

4. All the following are possible results of acute appendicitis, except:
- A. Spontaneous resolution of inflammation.
 - B. Gangrene and perforation.
 - C. Appendix mass.
 - D. Mucosal ulcerations that cause severe bleeding.
 - E. Chronic appendicitis.

D. Appendicitis is never a cause of any significant bleeding.

5. The following signs and symptoms are consistent with acute unruptured appendicitis, except:

- A. The patient is writhing in pain.
- B. Pain is initially central abdominal, then moves to the right iliac fossa.
- C. Positive Rovsing's sign.
- D. Pain on extending the right hip joint.
- E. Mild temperature elevation.

A. In acute appendicitis the patient remains still because movements aggravate the pain.

6. One of the following is strongly against the diagnosis of acute appendicitis:

- A. Vomiting precedes pain.
- B. Maximum point of tenderness is higher than McBurney's point.
- C. No abdominal rigidity.
- D. Normal white cell count.
- E. Normal ultrasound examination.

A. In acute appendicitis vomiting occurs in about three fourths of patients, but usually is not repeated. It is always preceded by the pain. If vomiting precedes the appearance of abdominal pain, one should think of another diagnosis.

If the right colon is short, the appendix lies in a higher position than usual. It may even be subhepatic. Acute inflammation in these cases makes the maximum point of tenderness to be present higher than McBurney's.

Rigidity is a feature of peritonitis due to rupture of the appendix. In uncomplicated cases there is tenderness in the right lower quadrant but no rigidity.

A normal leucocyte count does not exclude appendicitis. On the other hand, a high count with shift to the left supports the clinical diagnosis.

Abdominal ultrasound may diagnose appendicitis in only a few cases where the appendix appears distended and non-compressible. More important is the use of ultrasound for exclusion.

of other conditions that simulate acute appendicitis, e.g., right ureter obstruction or tubo-ovarian diseases.

7. The common differential diagnoses of acute appendicitis include all the following, except:

- A. Right tubo-ovarian causes.
- B. Right ureter stone.
- C. Mesenteric adenitis.
- D. Colon diverticulitis.
- E. Meckel's diverticulitis.

D. Colonic diverticulitis presents by clinical feature that are similar to those of acute appendicitis but on the left side.

8. Only one statement about acute appendicitis is correct:

- A. A normal leucocytic count excludes acute appendicitis.
- B. The point of maximum tenderness is always fixed at McBurney's point.
- C. The tip of the appendix is a common site of gangrene and rupture.
- D. Laparoscopic appendicectomy should be considered experimental.
- E. Portal pyaemia is a common complication.

C. The appendicular artery runs in the mesoappendix and is closely applied to the appendix wall distally. Therefore, with acute appendicitis, thrombosis and consequent gangrene are likely to affect the tip of the appendix.

Laparoscopic appendicectomy is a universally accepted technique. The main advantage of laparoscopy is its exploratory potential, because the whole peritoneal cavity is inspected. Less pain, and hospital stay, together with faster recovery are other possible assets.

Portal pyaemia is a rare complication of acute appendicitis. It results from suppurative thrombophlebitis of the portal venous system. Chills, high fever, jaundice, and, later, hepatic abscesses are the features of this grave condition.

9. All the following statements about acute appendicitis are true, except:

- A. Pain precedes vomiting.
- B. The initial central pain is visceral while the later localized iliac pain is somatic.
- C. A ruptured appendix in a young child is less likely to cause generalized peritonitis than in an adult.
- D. Laparoscopy is a particularly useful diagnostic aid for females in the child-bearing period.
- E. A negative Rovsing's sign does not exclude appendicitis.

C. In a young child the greater omentum is not well developed and so localization of peritonitis is difficult.

10. The treatment of uncomplicated appendicitis is:

- A. Observation. Operation is done if rupture occurs.

- B. Oral metronidazole and a cephalosporin at home.
- C. IV metronidazole and a cephalosporin in hospital.
- D. Urgent surgical removal of the appendix.
- E. Appendicectomy after three months.

D. Urgent appendicectomy is the classic treatment. It is a simple operation that obviates grave complications.

11. About treatment acute appendicitis, all the following statements are true, except
- A. The treatment of rupture and peritonitis is urgent appendicectomy and removal of pus.
 - B. The treatment of appendix abscess is initially conservative then appendicectomy after 3-6 months.
 - C. Perioperative antibiotics reduce the incidence of wound infection.
 - D. If the patient under anaesthesia is examined before the incision, and an appendix mass is felt, the operation has to be cancelled.
 - E. Most of appendix masses resolve spontaneously under conservative treatment.

B. The treatment of appendix mass is initially conservative then appendicectomy after 3 months. This does not apply to an appendix abscess. The treatment of an abscess, anywhere in the body, is drainage. The initial treatment of an appendix abscess, therefore, is drainage, whether it is by open surgery or by ultrasound-guided percutaneous drainage. The appendix then needs to be removed after an interval of 3-6 months when the surrounding adhesions resolve and appendicectomy becomes a safe procedure.

12. With regard to appendicitis, all the following statements are true, except
- A. McBurney's point is at the junction of the outer third and inner two thirds of a line that connects the umbilicus and the right anterior superior iliac spine.
 - B. The presence of an appendix mass necessitates urgent appendicectomy.
 - C. Loss of appetite is a common feature of acute appendicitis.
 - D. Rovsing's sign is an increase in pain in the right iliac fossa when the left iliac fossa is deeply palpated.
 - E. McBurney's incision has a low incidence of incisional hernia.

B. For an appendix mass urgent appendicectomy is not recommended because:

- An appendix mass represents success of the body to isolate the danger. It is better left undisturbed.
- Appendicectomy is technically difficult and carries the hazard of injuring the adherent intestine leading to peritonitis or faecal fistula.

In a McBurney's incision muscles are not cut but their fibres are split along their direction. It is described as a muscle splitting incision. The three lateral abdominal muscles run in different directions. Splitting the three muscle layers in different directions gives it the name "grid-iron incision". Muscle fibres recoil to their place by the end of the operation giving strength to this incision.

13. If at operation for removal of the appendix, this organ looks healthy, the surgeon should examine the following, except:

- A. The terminal 2 metres of the small intestine.
- B. The mesentery of the terminal ileum.
- C. The right kidney.
- D. The right ovary
- E. The right Fallopian tube.

C. The kidney and ureter are retroperitoneal organs; the kidney, in particular, is too far away from the incision. They are not accessible at appendicectomy operation. A reliable way to check them is to do preoperative ultrasound to look for right hydronephrotic changes, and to do routine urine analysis.

14. About masses in the right iliac fossa, all the following statements are true, except:

- A. An appendix mass is the commonest mass in the right iliac fossa.
- B. A pericolic mass of diverticulitis is the second common mass in the right iliac fossa.
- C. Cancer of the caecum may present by a mass in the right iliac fossa.
- D. Tuberculosis may present by a mass in the right iliac fossa.
- E. Crohn's disease may present by a mass in the right iliac fossa.

B. A pericolic mass of diverticulitis is frequently seen, but it is a disease of the left side of the abdomen, not the right.

15. About acute appendicitis all the following statements are true, except:

- A. Pelvic appendicitis presents by deep pelvic pain, tenesmus and dysuria.
- B. Retro-ileal appendicitis presents by diarrhoea.
- C. Acute appendicitis in the elderly carries worse prognosis than in young adults.
- D. During pregnancy the maximum point of tenderness of appendicitis is higher than McBurney's.
- E. The treatment of uncomplicated acute appendicitis during pregnancy is conservative.

E. Uncomplicated acute appendicitis during pregnancy is treated like in the non-pregnant, i.e., by urgent appendicectomy. The appendix is better removed at an early stage before it ruptures. If the diagnosis and operation are delayed until it ruptures, there is a higher chance of abortion or premature labour (50% of cases). If the patient is operated upon before perforation, premature labour occurs in 30% of cases.

16. About appendicular tumours, all the following statements are true, except:

- A. The commonest tumour is adenocarcinoma.
- B. Carcinoid tumours arise from Kulchitsky cells.
- C. The majority of carcinoid tumours are benign.
- D. Adenocarcinoma may obstruct the lumen and cause appendicitis.
- E. Early adenocarcinoma is treated by right hemicolectomy.

A. Adenocarcinoma of the appendix is rare. The commonest is the carcinoid.
95% of carcinoid tumours are benign.

17. About carcinoid syndrome, all the following statements are true, except:
- A. The appendix is the commonest site for a carcinoid tumour.
 - B. Kulchitsky cells are part of the APUD system.
 - C. Carcinoid syndrome is produced by both benign and malignant carcinoid tumours.
 - D. Flushing with attacks of cyanosis and diarrhoea are manifestations of the syndrome.
 - E. Bronchospasm, and pulmonary stenosis are manifestations of the syndrome.

C. The carcinoid syndrome is produced only by malignant carcinoid tumours that metastasise to the liver.

Choose the single best answer

1. Where are the accessory spleens mainly found?

- A. Splenic hilum.
- B. Greater omentum.
- C. Lesser omentum.
- D. Gastrosplenic ligament.

A. The most common site of accessory spleens is the splenic hilum (80%). The importance of accessory spleens is that they should be searched for and removed when doing splenectomy for haematological disorders.

2. What is the main function of the spleen?

- A. Red blood cells production.
- B. Leukocyte production.
- C. Blood reservoir.
- D. Immunologic protection.

D. The most important function of the spleen is host defense (immunologic protection). The other function is sequestration (destruction) of old blood cells.

3. Hodgkin's lymphoma is discovered in a biopsy of a cervical lymph node. All the following statements are true, except:

- A. Splenectomy is not required for staging.
- B. Stage II involves disease in two lymph node groups on the same sides of the diaphragm.
- C. If the spleen is involved, in addition to the cervical nodes, the patient has stage III disease.
- D. Stage IV disease is treated mainly by radiotherapy.
- E. Lymphocyte-depletion type carries the worst prognosis.

D. Formerly laparotomy was the routine for staging of clinically-early Hodgkin's disease. Staging laparotomy consisted of wedge biopsy of the liver, splenectomy, biopsy of intra-abdominal lymph nodes, and biopsy of bone marrow from the iliac crest. Currently staging is done nonoperatively, making use of the modern imaging studies. Hodgkin's disease stages are:

- Stage I: Single involved lymph node group.
- Stage II: Two or more involved lymph node groups limited to one side of the diaphragm.
- Stage III: Involvement on both sides of the diaphragm with or without splenic involvement.
- Stage IV: Extralymphatic spread including liver, lung, bone marrow, skin, gut, and central nervous system.

Hodgkin's lymphoma is treated with chemotherapy and radiotherapy. As a general rule, early localized disease is controlled mainly by radiotherapy, while widespread systemic disease is mainly treated by chemotherapy.

4. Which one of the following malignancies is associated with Epstein Barr virus (EBV)?
- Burkitt's lymphoma.
 - Hodgkin's disease.
 - Nasopharyngeal carcinoma.
 - All of the above.

D. EBV is associated with all the above-mentioned malignancies.

5. About idiopathic thrombocytopenic purpura (ITP), all the following statements are true, except:

- Females are more affected than males.
- Platelet count is normal but their function is impaired.
- Megakaryocyte count in bone marrow is elevated.
- The disease usually presents with menorrhagia and petechiae.
- Prothrombin time is normal.

B. Platelet count is low in patients with ITP.

6. About idiopathic thrombocytopenic purpura (ITP), all the following statements are true, except:

- It is an autoimmune disease.
- The spleen is hugely enlarged.
- Treatment is not necessary for patients with platelet count of 60 000/uL.
- Corticosteroids with or without immunoglobulins is the main line of treatment.
- At splenectomy, missing the removal of accessory spleniculi may lead to recurrence.

B. The spleen is either of normal size or just minimally enlarged.

Patients with platelet count above 50 000/uL need no treatment, just follow-up.

Definitely patients with counts that are lower than 20 000/uL require treatment. The main line of treatment is corticosteroids. Immunoglobulins produce good results in some patients but are expensive.

7. Splenectomy for idiopathic thrombocytopenic purpura (ITP) obviates the further need for steroids in:

- 20% of patients.
- 35% of patients.
- 60% of patients.
- 75% of patients.

D. The primary treatment for ITP is oral corticosteroids (1-2 mg/kg per day of prednisone).

Prolonged steroid treatment is not without complications. Splenectomy may provide permanent discontinuation of steroid treatment in 75% of patients.

Indications for splenectomy in ITP are:

- Failure of steroid treatment.

- Development of steroid complications.

8. A 55-year-old patient presented with bleeding gastroesophageal varices and splenic vein thrombosis with good liver function. What is the treatment of choice?

- A. Beta blockers.
- B. Urgent splenectomy.
- C. Splenic vein ligation.
- D. Injection sclerotherapy of varices, then splenectomy.

D. Portal hypertension, that is caused by splenic vein thrombosis, is curable by splenectomy. Acute bleeding should be initially arrested with sclerotherapy or banding.

9. The haemolytic anaemia that responds best to splenectomy is:

- A. Autoimmune haemolytic anaemia.
- B. Thalassaemia.
- C. Hereditary spherocytosis.
- D. Sickle cell disease.

C. Sickle cell disease patients rarely require splenectomy. The spleen is usually not markedly enlarged because it suffers multiple infarctions (autosplenectomy).

10. About hereditary spherocytosis, all the following statements are true, except:

- A. It is transmitted as autosomal dominant disease.
- B. It is associated with marked increase in the incidence of gallstone formation.
- C. RBCs undergo lysis at a lower osmotic pressure.
- D. Reticulocyte count is elevated.
- E. Treatment is by splenectomy.

C. Actually, in hereditary spherocytosis, RBCs undergo lysis at a higher osmotic pressure. Pigment gallstones frequently form as a result of increased production of bilirubin.

11. The treatment of choice of a splenic abscess is:

- A. Antibiotic therapy and rest.
- B. Percutaneous drainage under ultrasound guidance.
- C. Partial splenectomy and antibiotics.
- D. Splenectomy and antibiotics.

D. Diagnosis is usually delayed. The patient presents with fever, upper left quadrant pain, leucocytosis and tender splenomegaly. It usually follows splenic vessel thrombosis and infarction especially in patients with sickle cell anaemia. The diagnosis is made by ultrasound and CT. Antibiotics, guided by culture and sensitivity, are given for 14-21 days but splenectomy is the definitive treatment. Percutaneous drainage is performed in patients who cannot tolerate surgery, particularly those who have unilocular abscesses.

12. What is the most common postoperative complication following splenectomy?

- A. Atelectasis of the left lower lobe of the lung.
- B. Subphrenic abscess.
- C. Burst abdomen.
- D. Haemorrhage.

A. The most common complication following splenectomy is left lower lobe lung collapse. Pleural effusion is also not uncommon.

13. Vaccination for elective splenectomy should be given:

- A. Two weeks before splenectomy.
- B. 1 week before splenectomy.
- C. With induction.
- D. Two weeks after surgery.

A. In 2-4% of patients, life-threatening infections could appear any time following splenectomy. Accordingly, it is advisable to give vaccines against streptococcus pneumoniae, meningococci, and B haemophilus influenza two weeks before elective splenectomy.

Choose the single best answer

1. What is the amount of body water in a full term healthy neonate?

- A. 55 ml/kg.
- B. 80 ml/kg.
- C. 90 ml/kg.
- D. 110 ml/kg.

B. In a full term new born, the total body water is about 80 ml/kg. In an adult it is 60 ml/kg.

2. About inguinal hernias in infants, all the following are true, except:

- A. It is usually of the oblique type.
- B. It is more common in boys than in girls.
- C. It never descends in the scrotum.
- D. Herniotomy is the operation of choice.
- E. The surgeon can reach the neck of the sac without opening the inguinal canal.

C. Inguinal hernias are more common in boys than girls (12:1). As it is of the oblique type, it may descend in the scrotum. Excision of the sac (herniotomy) is enough treatment. The surgeon can reach the neck of the sac without opening the inguinal canal because the internal ring is almost opposite the external one and the inguinal canal is very short.

3. About thyroglossal cysts, all the following are true, except:

- A. It usually presents in childhood.
- B. It moves up with tongue protrusion.
- C. It may get infected forming an abscess.
- D. It should be removed as soon as discovered because it is precancerous.
- E. Incomplete excision results in a thyroglossal fistula.

C. Thyroglossal cysts are usually diagnosed after the second or third year of life (between 2-5 years) when fat in the neck is reduced. The cyst is usually seen below the hyoid bone in the midline moving with protrusion of the tongue and with deglutition. It is not precancerous.

Thyroglossal fistulas develops after one of the following incidents:

- Spontaneous rupture of a thyroglossal abscess.
- Surgical drainage of a thyroglossal abscess.
- Incomplete excision of a thyroglossal cyst.

4. All the following statements about congenital diaphragmatic hernia of the Bochdalek type are true, except:

- A. More frequently occurring than the anterior type (Morgagni type).
- B. It occurs more frequently on the left side.
- C. Symptoms are caused by acid reflux.
- D. Plain X-ray of the chest is usually diagnostic.
- E. The stomach, intestine and spleen may prolapse in the chest cavity.

C. Unlike sliding hiatal hernia, the cardia is below the diaphragm and, therefore, reflux is not an issue.

5. The main danger in a congenital diaphragmatic hernia that is discovered in the newborn is:

- Respiratory failure.
- Circulatory failure.
- Intestinal obstruction.
- Peptic ulcers.
- Rupture of the spleen.

6. Newborns with congenital diaphragmatic hernia have a high mortality rate (more than 50%). It is mainly caused by respiratory failure that is due to:

- The prolapsed viscera compress the left lung and cause its collapse.
- The mediastinum may also be pushed to the left side to cause collapse of the left lung.
- The lungs are commonly hypoplastic because they were collapsed in intrauterine life.
- Furthermore these babies are prone to develop pulmonary hypertension that results in persistent foetal circulation. Pulmonary perfusion is reduced resulting in impaired oxygen and carbon dioxide exchange.

7. A neonate was born with respiratory distress in a district hospital and is diagnosed as having a Bochdalek-type diaphragmatic hernia. All the following should be done, except:

- Endotracheal intubation and mechanical ventilation.
- Placement of a nasogastric tube.
- Placement of a venous line and administration of IV fluids.
- Immediate surgical repair.

D. Though surgery is urgent, it should not be done in a general surgery unit. This baby should be operated upon in a specialized paediatric surgery unit or better still in a highly specialized neonatal surgery one. The baby is urgently transferred in an incubator in order to maintain a normal body temperature.

8. All the following are part of the VACTERL complex except:

- Vertebral anomalies.
- Congenital diaphragmatic hernia.
- Renal agenesis.
- Cardiac defects.
- Anorectal anomalies.

9. The acronym "VACTERL" helps to remember a group of congenital anomalies that are commonly associated:

- Vertebral (spina bifida with its various types).

- Tracheal.
- Esophageal.
- Renal.
- Limb anomalies.

It does not include congenital diaphragmatic hernia.

8. About choledochal cysts, all the following statements are true, except:

- A. They are caused by dilatation of the intra-hepatic bile ducts.
- B. The condition is congenital and usually presents in childhood.
- C. Choledochal cysts may present by jaundice, pain and fever.
- D. They may turn malignant.
- E. They are best treated by excision.

A. A choledochal cyst is the result of dilatation of the extrahepatic bile ducts. Cholangitis is one of the complications of a choledochal cyst. It presents with upper abdominal pain, jaundice and fever. Malignant transformation occurs in 2% of cases. This is why the preferred treatment is excision.

9. Any of the following organs may be a content of an exomphalos major, except:

- A. Liver.
- B. Pancreas.
- C. Colon.
- D. Small intestine.
- E. Omentum.

B. The pancreas is a retroperitoneal organ that is never a content of any hernia.

10. Gastroschisis is abdominal wall defect that is present at:

- A. The midline above the umbilicus.
- B. Just to the right of the umbilicus.
- C. Just to the left of the umbilicus.
- D. Exactly in the umbilicus.

B. Gastroschisis is a congenital defect in the anterior abdominal wall to the right of the umbilicus. It has no sac and the size of the defect is not large (less than 5 cm).

11. About Wilms' tumour, all the following statements are true, except:

- A. The tumour contains epithelial and connective tissue elements.
- B. The commonest presentation is haematuria.
- C. Differential diagnosis is neuroblastoma.
- D. The main line of treatment is nephrectomy.
- E. Chemotherapy improves prognosis.

B. Wilms' tumour is the commonest malignant tumour of the kidney in children.

The commonest presentation is by a mass. It is difficult to differentiate from a neuroblastoma of the adrenal gland. Another differential diagnosis is hydronephrosis due to congenital pectin-ureteric junction obstruction. The tumour is surgically removed. Adjuvant chemotherapy markedly improves prognosis. The 5 year survival rate is over 90%.

12. What is the best surgical procedure to correct biliary atresia?

- A. Choledochojejunostomy.
- B. Cholecystojejunostomy.
- C. Hepatoportojejunostomy.
- D. Hepatojejunostomy.

C. Hepatoportojejunostomy is the procedure of choice. The fibrous tissue at the porta hepatis has microscopically patent biliary channels that communicate with the intrahepatic ducts. Dissection of the fibrous tissue at the liver hilum opens these channels and allows bile to flow into the surgically constructed Rou-en-Y limb of the jejunum.

13. What is the diagnostic method of choice in Hirschsprung's disease?

- A. Transition zone on the contrast barium enema.
- B. Rectal biopsy.
- C. Genetic coding analysis.
- D. Inability to pass meconium.

B. Rectal biopsy is a definite diagnosis of Hirschsprung's disease.

14. The most common site of cystic hygroma is:

- A. Axilla.
- B. Posterior triangle of the neck.
- C. Groin.
- D. Mediastinum.

B. Although cystic hygromas can occur in all of the above places, the commonest is the posterior triangle of the neck, followed by the axilla. A cystic hygroma is caused by obstruction of the developing lymph vessels. It occurs in 1 in 10,000 births.

15. Prune belly syndrome is associated with the following manifestations except:

- A. Lax abdominal wall.
- B. Dilated ureter and urinary bladder.
- C. Bilateral undescended testes.
- D. Cardiac anomalies.

D. Prune-belly syndrome is characterized by all the above except cardiac anomalies.

16. About tracheo-oesophageal fistulas, all the following are true, except:

- A. Antenatal diagnosis is possible.

- B. It is characterized by being an isolated anomaly.
- C. It presents by dribbling saliva and choking attacks.
- D. The main threat is aspiration pneumonia.
- E. Early surgical repair improves prognosis.

8. The commonest type of this anomaly is the proximal blind atresia with distal tracheo-oesophageal fistula (87%). Antenatal ultrasound may show a dilated upper pouch of the oesophagus.

It is commonly associated with other congenital anomalies (VACTERL). The cardiac anomalies, in particular, markedly affect its prognosis.

17. In undescended testes, orchidopexy causes one of the following:

- A. Improves fertility.
- B. Improves the hormonal function of the testis.
- C. Totally eliminates the risk of malignant transformation.
- D. Increases the risk of testicular torsion.
- E. None of the above.

A. Orchidopexy means placing the testes back into the scrotum. This improves their spermatogenic function.

Testosterone production is not affected by the abnormal position of the testes and surgery has no effect on their hormonal function.

Testicular torsion and strangulation of a concomitant hernia are possible complications of undescended testes. As herniotomy is a part of the operation, orchidopexy eliminates both complications.

Undescended testes are more prone to malignant transformation than the normally-situated ones. Orchidopexy reduces this tendency but does not eliminate it. The good thing is that orchidopexy facilitates early detection if it happens.

18. The common causes of neonatal intestinal obstruction include all the following, EXCEPT:

- A. Small intestinal atresia.
- B. Meconium ileus.
- C. Idiopathic ileo-caecal intussusceptions.
- D. Hirschsprung's disease.
- E. Midgut volvulus.

C. Idiopathic ileo-caecal intussusceptions does not affect neonates. Its peak incidence is between 6-12 months of age.

19. About volvulus neonatorum, one statement only is true:

- A. The band of Ladd obstructs the duodenum.
- B. It is volvulus of the foregut.
- C. It is volvulus of the hindgut.
- D. It is a form of simple obstruction.

E. At the end of operation for this disease, the caecum is fixed in the right iliac fossa.

A. This is midgut volvulus. Like sigmoid volvulus, it is a form of strangulation obstruction. If neglected it causes extensive bowel gangrene.

20. What is the initial treatment of complete bowel obstruction due to uncomplicated meconium ileus?

- A. Nasogastric decompression.
- B. Laparotomy exploration.
- C. Contrast enema.
- D. None of the above.

C. Uncomplicated meconium ileus can be treated by a dilute water soluble contrast agent that is introduced through the colon under fluoroscopic guidance up to the dilated ileum. The enema is done every 12 hours for 4-5 days until all meconium is evacuated.

21. What is the maximum pressure applied in air enema for reduction of intussusceptions in children?

- A. 60 mmHg.
- B. 70 mmHg.
- C. 90 mmHg.
- D. 120 mmHg.

D. Air is introduced with a manometer and the pressure is carefully monitored. Pressure should not exceed 120 mmHg.

Air enema (or barium enema) is done in early cases where there is no suspicion of bowel gangrene. It has a success rate of 75%. When reduction is achieved, air is seen to reflux into the small bowel. The infant dramatically improves and becomes pain free.

Choose the single best answer

1. Embryologic origin of melanocyte is from:

- A. Neural crest.
- B. Ectoderm.
- C. Endoderm.
- D. Mesoderm.

A. Melanocytes originate from neural crest and are transported into the epidermis.

2. One statement only about Marjolin's ulcer is true:

- A. It results from chronic pressure.
- B. It is carcinoma that arises on top of a chronic benign ulcer.
- C. It is a malignant ulcer that arises on top of lymphoedema.
- D. It is a form of melanoma.
- E. It is a form of basal cell carcinoma.

B. Marjolin's ulcer is a squamous cell carcinoma (SSC) that arises in a chronic ulcer or a chronic scar.

3. Capillary haemangioma of the face requires which of the following investigation before starting treatment?

- A. MRI of the sinuses.
- B. CT of the brain.
- C. Liver ultrasound.
- D. Venous Duplex of the lower limbs.

B. CT of the brain is needed to rule out intracranial lesions (Berry aneurysms).

4. Among the following, which is the most common type of basal cell carcinoma (BCC)?

- A. The superficial spreading type.
- B. The pigmented type.
- C. The nodular type.
- D. None of the above.

C. BCC is the most common type of skin cancer. The nodulocystic and noduloulcerative types accounts for about 75% of all BCC.

5. Which type of melanoma has the best 5 year survival?

- A. Nodular type.
- B. Superficial spreading type.
- C. Lentigo maligna.
- D. Acral lentiginous.

C. The most common type is the superficial spreading which accounts for 75% of all melanomas. These are flat and can affect any part of the body except the feet and hand. The nodular type accounts for 15% of all melanomas. The lentigo-maligna accounts for 5-10% of melanomas and occur on the face, neck, hands in elderly population. This has the best prognosis because of their slow growth and delayed invasion.

6. What is the safety margin at the time of excision of a 2.5 mm thick melanoma?

- A. 1 cm.
- B. 2 cm.
- C. 3 cm.
- D. 5 cm.

B. For all lesions between 1 mm – 4 mm thickness, the safety margin (tumour free) should be at least 2 cm.

7. About depth of a burn, all the following statements are true, except:

- A. Burns that are caused by hot water (scalds) tend to be of partial thickness.
- B. Partial-thickness burns tend to be less painful than full-thickness ones.
- C. If kept clean and protected, partial-thickness burns heal within three weeks.
- D. Partial-thickness burns show blisters.
- E. Full-thickness burns require excision and grafting.

B. Partial thickness burns are very painful and sensitive to air, while full thickness burns are painless due to loss of the terminal nerve endings. This can be elicited clinically by the pinprick test.

8. About burn eschar, all the following statements are true, except:

- A. A circumferential limb eschar may cause ischaemia of this limb.
- B. A circumferential chest eschar may cause respiratory impairment.
- C. Eschar is insensitive tissue that can be divided without anaesthesia.
- D. Eschar is formed of stiff fibrous tissue.
- E. Partial-thickness burns do not produce eschars.

Eschar is an inelastic dead tissue (not fibrous tissue) that results from a full-thickness burn. Limb circumferential eschars may cause acute compartment syndrome. Likewise in the chest they limit chest wall expansion. Because it is dead tissue escharotomy can be done as a bedside procedure, without anaesthesia.

9. About inhalation burns, all the following statements are true, except:

- A. They are likely to happen with flame burns in confined places.
- B. They should be suspected with facial burns.
- C. Airway obstruction is the main threat to life.
- D. All inhalation-burn victims should be admitted to hospital.
- E. All inhalation-burn victims should have tracheostomy.

E. Flames or very hot air may be inhaled causing burns in:

- Upper respiratory tract causing laryngeal oedema and possibly stridor.
- Lower respiratory tract causing pneumonia and ARDS, which lead to respiratory failure.

Inhalation burns are suspected in the following circumstances:

- Closed space burns.
- Facial burns.
- Burnt nasal hairs.
- Carbonaceous sputum.
- Wheezing, pharyngeal oedema, or hoarseness of voice.

When inhalation burns are suspected consider:

1. Early intubation. A tracheostomy is seldom needed.
2. High-flow oxygen.
3. Admission to hospital, with possible need for mechanical ventilation.

10. All the following are indications for admission of a burn victim to hospital, except:

- A. A 10% flame burn that affects the face of an adult.
- B. A 13% scald of the trunk in a 4-year old boy.
- C. A 10% burn that involves the perineum.
- D. A 10% burn that affects the front of the abdomen.
- E. High-voltage electric burn.

D. Major burns (more than 15% in adults and 10% in children) are admitted to hospital. Less extensive burns may need admission, e.g.:

- Burns of the face as they are likely to be associated with inhalation burns of the respiratory tract.
- Burns of the perineum as they may cause retention of urine.
- High-voltage burns. The apparent inlet and exit burns may be of minor extent, but the whole pathway of current within the body is also injured. These victims are also likely to have arrhythmias.

11. Improvement in burn survival is attributed to:

- A. Prophylactic antibiotics.
- B. Nutritional support (enteral and parenteral).
- C. Early excision and grafting.
- D. Fresh frozen plasma administration.

C. Early excision and grafting dramatically improve survival of burned patients. After the patient stabilization, burn excision and covering is done as soon as the condition of the patient allows (72 hours). This reduces septic complications, improves survival and reduces hospital stay. The role of prophylactic antibiotics is controversial.

12. All the following statements about sebaceous cysts are true, except:

- A. They are common in children.
- B. They do not appear on the palm.
- C. Infection is the commonest complication.

- D. They are attached to the skin.
E. Sometimes the punctum cannot be seen.

A

13. Precancerous skin lesions include all the following, except:
- A. Bowen's disease
 - B. Xeroderma pigmentosa
 - C. Giant hairy nevus in children
 - D. Keratoacanthoma (molluscum sebaceum)
 - E. Squamous keratosis (actinic or solar keratosis)

D

14. A giant hairy nevus is excised mainly because of:
- A. The risk of malignant transformation
 - B. The unsightly appearance
 - C. The frequent bleeding on contact with clothing
 - D. The frequent attacks of infection
 - E. Ulceration

A

15. Regarding basal cell carcinoma, one statement only is true:
- A. Occurs most commonly in the legs.
 - B. Arises from a preexisting nevus.
 - C. Spreads to lymph nodes.
 - D. Histologically it shows cell nests with keratin inside
 - E. Surgical excision is the main line of treatment.

E

16. What are the factors that increase the incidence of cleft lip and palate?
- A. Increased parental age.
 - B. Smoking during pregnancy.
 - C. Positive family history.
 - D. All of the above.

D. All of the above factors are likely to increase the incidence of cleft lip and palate.

17. Involution of haemangioma in 70% of patients occurs at the age of:
- A. 2 years.
 - B. 3 years.
 - C. 4 years.

D. 7 years.

0

18. After mastectomy, immediate breast reconstruction is associated with which one of the following problems:

- A. Delayed detection of recurrence.
- B. Increased morbidity and delayed healing.
- C. Delayed chemotherapy.
- D. None of the above.

D. Immediate breast reconstruction does not delay chemotherapy treatment and is not associated with increased morbidity or delayed healing and does not delay early recurrence detection.

19. The child with multiple cutaneous haemangioma should have which one of the following diagnostic test?

- A. CT chest and abdomen.
- B. Abdominal ultrasound.
- C. MRA of abdominal vasculature.
- D. None of the above.

B. In multiple haemangiomas (less than 20%), abdominal ultrasound should be performed to rule out haemangiomas involving other abdominal organs especially the liver. Ultrasound is simpler and more practical than CT, particularly for a child.

20. A graft taken at a dermal level including elements of epidermis and dermis:

- A. Is a full thickness graft.
- B. Requires 10 days before blood flow is established in it.
- C. Is used when large areas of skin are required.
- D. All of the above.

C. This is a split skin graft shaved at a dermal level and includes elements of epidermis and dermis. The donor site heals spontaneously. Split skin grafts are indicated where large areas of skin are needed such as in burns or when the graft bed has relatively poor vascularization.

21. Dupuytren's contracture is best treated by:

- A. Surgery.
- B. Steroids.
- C. Splinting.
- D. Physiotherapy.

A. In advanced cases with severe contracture of the digits with limited function, surgery is the treatment of choice.

22. Phalen's and reversed phalen's test are diagnostic in:

- A. Carpal tunnel syndrome.
- B. Neuroma.
- C. Malunion of the scaphoid bone.
- D. Trigger finger.

A. Maximal flexion of the wrist for 30 seconds and maximal extension of the wrist are used for diagnosis of carpal tunnel syndrome (Phalen's and reversed Phalen's test). Pressure is applied over the carpal tunnel while performing the test.

23. Ganglion cyst is most commonly located at:

- A. Anterior aspect of the wrist.
- B. Posterior aspect of the wrist.
- C. Dorsum of the hand.
- D. Palmar surface of the hand.
- E. Tip of a finger.

B. This non-neoplastic mucinous cyst most commonly arises at the dorsal aspect of the wrist.

24. What is the most common hand anomaly?

- A. Syndactyly.
- B. Club hand.
- C. Polydactyly.
- D. Constriction band.

A. Syndactyly is the most common anomaly in which two or more fingers are fused together. It may affect both hands. Males are usually more affected.

25. Drainage of distal pulp space infection is done through:

- A. Bilateral incision of each side of the finger.
- B. Incise the nail fold.
- C. Transverse incision on the fingertip.
- D. Short longitudinal skin incision on area of maximum fluctuance not crossing the interphalangeal joint crease.

D. Distal pulp space infection is best treated by short longitudinal incision not crossing the interphalangeal joint crease. Pus is evacuated and gauze is packed to prevent skin closure. The incision should only be in the skin and pus evacuated by blunt instrument, then a finger splint with loose dressing is applied.

26. Stenosing tenosynovitis (trigger finger) is best treated initially by:

- A. Early surgery.
- B. Physiotherapy.
- C. Corticosteroid injection.
- D. None of the above.

C. This condition is characterized by a locked digit in flexion position. Passive manipulation is needed to regain neutral position. Oral anti-inflammatory medication and splinting may help, but steroid injection into the sheath of the tendon is effective in relieving the condition.

27. De Quervain Tenosynovitis presents with pain at the:

- A. Radial aspect of the wrist.
- B. Dorsal aspect of the wrist.
- C. Volar aspect of the wrist.
- D. Ulnar aspect of the wrist.

A. Pain in De Quervain tenosynovitis appears on the radial aspect of the wrist and is aggravated by thumb motion and making a fist. In some patients, a lump can be felt above the styloid process of the radius.

28. What is the most common tumour of the hand?

- A. Fibroma.
- B. Angioma.
- C. Enchondroma.
- D. Osteoclastoma.

C. This is the most common primary bone tumour of the hand. It arises from cartilage mostly in the proximal phalanges. X-ray shows a well defined radiolucent lesion in the diaphysis.

Choose the single best answer

1. What is the normal ankle brachial index (ABI)?
 - A. More than 1.
 - B. Less than 0.8.
 - C. 0.9.
 - D. 1.

A. The ABI is calculated by measuring the blood pressure in both upper limbs using the highest systolic BP. The ankle BP is measured by placing the cuff above the ankle and measuring the return of flow in the dorsalis pedis by a Doppler probe. The ratio of both ankle and brachial is called ABI and is normally higher than 1.

2. Which artery supplies collateral flow between the celiac artery (CA) and superior mesenteric artery (SMA)?
 - A. Middle colic artery.
 - B. Pancreaticoduodenal arteries.
 - C. Left colic artery.
 - D. Marginal artery of Drummond.
 - E. None of the above.

B. The superior pancreaticoduodenal artery is a branch of the gastroduodenal, which in turn is a branch of the hepatic branch of the celiac trunk. The inferior pancreaticoduodenal artery is a branch of the superior mesenteric artery. Both pancreaticoduodenal arteries anastomose with each other as they supply the head of pancreas and the duodenum.

3. Which arteries supply collateral flow between the superior mesenteric artery (SMA) and inferior mesenteric artery (IMA)?
 - A. Marginal artery of Drummond.
 - B. Inferior pancreaticoduodenal artery.
 - C. Left gastric artery.
 - D. Splenic artery.
 - E. None of the above.

A. The marginal artery of Drummond runs along the whole length of the colon. It connects the SMA with the IMA.

4. What is the percentage of diabetes mellitus in patients suffering vascular disease?
 - A. 30%.
 - B. 10%.
 - C. 50%.
 - D. 20%.

A. If we take a careful history, about 30% of atherosclerotic arterial disease patients have diabetes mellitus.

Patients with vascular disease have the following manifestations as well:

- Carotid artery disease.
- Coronary artery disease.
- Diabetes.
- Hypertension.
- Hyperlipidaemia.
- Smokers.

All the above mentioned manifestations should be enquired about, and the severity of the each disease should be assessed.

5. What is the best conduit to be used in femoropopliteal bypass operations?

- A. Human umbilical vein.
- B. Gore-Tex PTFE.
- C. Dacron.
- D. Autogenous vein.

D. The best choice is the autogenous vein whether it is for above the knee or below knee position.

6. What is the percentage of stenosis that increases the incidence of stroke in patients suffering from internal carotid artery (ICA) atherosclerosis?

- A. 30%.
- B. 50%.
- C. 60%.
- D. 70%.

D. The risk of atheroembolization is markedly increased with increasing degree of ICA stenosis due to turbulence of flow in the stenotic artery. Patients with 70% stenosis of ICA or more are candidates for intervention (preferably surgical).

7. Occlusion of which of the following arteries causes amaurosis fugax?

- A. Internal carotid artery (ICA).
- B. External carotid artery (ECA).
- C. Middle meningeal artery.
- D. None of the above.

A. Amaurosis fugax is a condition of transient loss of vision in one eye that lasts for few seconds to few minutes. It is caused by extracranial ICA occlusive disease.

8. Diagnosis of renal artery hypertension is best achieved by:

- A. Renal artery duplex ultrasound.
- B. Selective angiography.
- C. MRA.
- D. None of the above.

8. Selective angiography with digital subtraction angiography (DSA) is the best method of diagnosis of renal artery hypertension. Flush aortography is first performed to detect any accessory renal arteries.

9. Which is true regarding endovascular abdominal aortic aneurysm repair?

- A. It costs the same as open repair.
- B. Requires lifelong follow-up imaging.
- C. Results in longer hospital stay than open repair.
- D. Requires more blood transfusion than open repair.

5. Endovascular repair requires lifelong follow-up.

Endovascular repair is less invasive and less blood transfusion is needed, and the ICU stay and ordinary hospital stays are less than the open surgical repair. The main disadvantage of the endovascular procedure is its high cost. Endovascular repair cost is nearly twice as much as the open surgical repair.

10. What is the incidence of coronary artery disease in patients with peripheral arterial disease?

- A. 10%.
- B. 60%.
- C. 40%.
- D. 70%.

C. In evaluation of a patient with peripheral arterial disease, coronary and carotid disease should be investigated. About 40% of all patients with peripheral arterial disease have significant coronary artery disease (CAD) that might not be symptomatic due to the limited exercise ability. Significant CAD and carotid artery disease should have the priority in management. Myocardial infarction accounts for the majority of both early and late postoperative deaths if not noticed and properly treated.

11. About revascularization procedures, all the following statements are true, *EXCEPT*:

- A. The patency rate of aortobifemoral bypass is lower than that of femoro-popliteal bypass.
- B. Short-segment iliac artery stenosis can be successfully treated by percutaneous angioplasty.
- C. A synthetic graft is used for aortobifemoral bypass.
- D. Reversed saphenous vein is used for femoropopliteal bypass.
- E. For in situ saphenous vein femoropopliteal bypass destruction of the venous valves is necessary.

A. Aortobifemoral bypass graft has an excellent 10 year patency rate of about 75-80%. This is because of the high flow rate of blood in this graft.

12. What is the initial treatment in patients with acute lower limb ischemia?

- A. Thrombolysis.

- B. Surgical embolectomy.
- C. Heparinization.
- D. None of the above.

C. The patient should be immediately given heparin to prevent clot propagation.

13. Patients with intermittent claudication and short claudication distance are expected to have an ankle/brachial index (ABI) of:

- A. 1.
- B. 0.9.
- C. 0.6.
- D. 0.5.

- D
- Patients with intermittent claudication and a short claudication distance usually have an ABI of about 0.5.
 - Patients with rest pain have an ABI of 0.3-0.4.
 - Patients with gangrene have an ABI of less than 0.3.

14. Aortography is indicated for:

- A. All patients with claudication pain.
- B. Ischaemic ulcer of the heel.
- C. Suspected Buerger's disease.
- D. Acute embolism.
- E. Ruptured aortic aneurysm.

B. Ischaemic ulcer, gangrene and rest pain are conditions that are called "critical limb ischaemia". This is best solved by revascularization, which requires pre-intervention arteriography.

15. The following statements about abdominal aortic aneurysms (AAA) are all true, except:

- A. The commonest cause is atherosclerosis.
- B. They are usually present above the level of renal arteries.
- C. The main risk is rupture.
- D. Mural thrombi can migrate to cause distal embolization.
- E. Endovascular treatment is possible.

B. Fortunately the majority of these aneurysms lie below the level of renal arteries. The aorta can be clamped during surgery while preserving the renal blood flow.

16. About abdominal aortic aneurysm (AAA), all the following statements are true, except:

- A. Normal diameter of the abdominal aorta is 2-3cm.
- B. Aortic aneurysms with a diameter of 5cm are advised to have urgent repair.

- C. The main risk of abdominal aortic aneurysm is rupture.
- D. One of its complications is distal embolization.
- E. CT scan is an excellent method of diagnosing abdominal aortic aneurysms.

B. The main risk is rupture. Formation of a thrombus in the aneurysm and distal embolization are possible other complications.

- The normal diameter of abdominal aorta is 2-3 cm.
- AAA is considered if diameter is greater than 4.5-5 cm. This is considered a small AAA with an estimated annual risk of rupture of 1% and this risk is estimated to be 6-10% in 5 years.
- For AAA with a diameter of 6-7 cm the estimated annual risk of rupture is 5-10% and 5 years risk of rupture is 50%.
- AAA with a diameter larger than 7 cm should be advised to have rapid elective intervention after assessment of the coronary and carotid artery status, as the annual rupture risk rate is about 15% and the 5 years risk of rupture is almost 100%.

17. About Buerger's disease, all the following statements are true, except:

- A. It mostly affects the iliac arteries.
- B. It affects male only.
- C. It affects smokers only.
- D. Pain is an early symptom.
- E. Arterial reconstruction is not possible.

A. This is a type of arteritis that affects distal arteries of the lower limbs. It actually affects the neighbouring vein and nerve as well. Nerve inflammation is the cause of early occurrence and severity of pain. Arterial reconstruction is not feasible. Abstinence from smoking is essential to prevent progression of the disease. Lumbar sympathectomy can improve skin blood supply only.

18. All the following are strong signs of arterial injury, except:

- A. Any haematoma in the course of an artery.
- B. External arterial bleeding.
- C. Absent distal pulses.
- D. A palpable thrill at the site of trauma.

A. Only expanding or pulsating haematomas are strong indications of arterial injury.

19. The commonest source of arterial lower limb emboli is:

- A. Thrombus in thoracic aortic aneurysm.
- B. Thrombus in abdominal aortic aneurysm.
- C. Cardiac mural thrombus on top of myocardial infarction.
- D. Deep vein thrombosis; the embolus passing through ASD to the arterial side.
- E. Left atrial thrombus.

E. The usual source is a left atrial thrombus that forms there as a result of mitral stenosis and atrial fibrillation.

20. About arterial embolism, all the following statements are true, except:

- A. The commonest are thrombemboli.
- B. A thromembolus usually impacts at the bifurcation of an artery.
- C. Embolectomy can be done under local anaesthesia.
- D. Tense calf muscles is a bad prognostic sign.
- E. Fasciotomy is necessary for all cases.

Air embolism, fat embolism and parasitic embolism are all far less frequent than thrombembolism.

Fasciotomy is not needed if embolectomy is done at an early stage and the muscles are still supple.

Choose the single best answer

1. Where are the Cockett perforators present?
- Lateral thigh.
 - Medial lower leg.
 - Lateral lower leg.
 - Femoral triangle.
 - None of the above.

3. The Cockett perforator veins drain the medial lower leg connecting the posterior arch vein to the posterior tibial vein. In general, the perforator veins pierce the deep fascia to connect the superficial venous system with the deep venous system.

2. What is the mechanism of action of heparin?
- Increase of the activity of antithrombin.
 - Increase the conversion of factor X to Xa.
 - Increase conversion of factor IX to IXa.
 - None of the above.

A. Heparin binds to antithrombin increasing its activity to over 900 folds. The antithrombin-heparin complex inhibits thrombin (IIa) and factor Xa. Heparin also binds to tissue factor inhibiting the conversion of factor X to Xa and IX to IXa.

3. Thrombolysis is achieved by:
- Decreased activity of thrombin.
 - Converting thrombin to fibrin.
 - Converting plasminogen to plasmin.
 - All of the above.

C. Streptokinase and urokinase are both thrombolytic drugs that induce thrombolysis by converting plasminogen to plasmin leading to fibrin degradation.

4. Inherited predisposition to deep vein thrombosis includes all the following causes, except:

- Factor V Leiden mutation (heterozygous and homozygous)
- Antithrombin deficiency.
- Protein S excess.
- Protein C deficiency.

C. It is, in fact, deficiency of protein S that causes hypercoagulability and tendency to DVT.

5. All the following factors increase the susceptibility to postoperative deep vein thrombosis (DVT), except:

- Anaemia.

- B. Obesity.
- C. The intake of contraceptive pills.
- D. Malignancy.
- E. History of previous DVT.

A. Anaemia is the exception. Polycythaemia is the factor that raises the incidence of DVT.

6. Which of the following veins are valveless?

- A. Great saphenous vein.
- B. Short saphenous vein.
- C. Portal vein.
- D. Common femoral vein.

C. The portal vein, inferior vena cava (IVC) and common iliac veins do not have valves.

7. Which of the following should be monitored in patients who are anticoagulated with heparin?

- A. Bleeding time.
- B. PT.
- C. APTT.
- D. None of the above.

C. The level of antithrombotic therapy should be monitored 4 hourly by APTT (activated partial thromboplastin time) aiming at keeping it at double the control value.

8. Which of the following is monitored during anticoagulation with Warfarin?

- A. Platelet count.
- B. Bleeding time.
- C. INR.
- D. APTT.

C. Patients on Warfarin should be monitored by INR (international normalized ratio). For adequate anticoagulation the INR is kept between 2 and 4.

9. What is the time needed to achieve adequate anticoagulation in patients who are starting Warfarin?

- A. 6 hours.
- B. 24 hours.
- C. 48 hours.
- D. 72 hours.
- E. None of the above.

C. Factor II and factor X have a half life of 36-72 hours, so full anticoagulation is achieved usually after 72 hours and a steady state is achieved after 4-6 days.

10. Phlegmasia Alba Dolens is due to:

- A. Obliteration of collateral veins of the legs.
- B. Reperfusion injury following injury of the femoral vein.
- C. Obliteration of the major deep venous channels and sparing the collateral veins.
- D. Reperfusion injury following injury of the femoral artery or vein.

C. This is a condition of massive DVT due to major deep venous channel obliteration (common or external iliac vein) with sparing of collateral veins. Clinically, the patient has swollen limbs (pitting edema), blanching, and severe pain.

11. Phlegmasia Cerulea Dolens is due to:

- A. Obliteration of a major venous channel but not the superficial collaterals.
- B. Obliteration of a major venous channel extending to the collateral veins.
- C. Venous and arterial injury.
- D. None of the above.

B. Phlegmasia Cerulea Dolens is due to obliteration of major venous channel as well as obliteration of the collateral channels. Clinically, the patient presents with severe agonizing pain and severe oedema with cyanosis of the lower limbs. Compartment syndrome is due to massive sequestration of fluid. If not promptly treated, the patient may develop venous gangrene of the foot.

12. What is the incidence of DVT after major surgery in patients not receiving anticoagulation prophylaxis?

- A. 20%
- B. 25%
- C. 30%
- D. 40%

D. Patients undergoing major surgery without DVT prophylaxis have a significant incidence of developing thromboembolism (40% or more).

13. Preventive measures against postoperative DVT include all the following, except:

- A. Early ambulation.
- B. Adequate hydration.
- C. Warfarin prophylaxis.
- D. Low molecular weight heparin.
- E. Intermittent pneumatic compression.

C. Warfarin is used for long-term prophylaxis, for example, for patients with prosthetic cardiac valves.

14. About perioperative anticoagulant prophylaxis, all the following are true, except:

- A. Should be started immediately after surgery.

- B. Is indicated for obese patients.
- C. Heparin is the usual agent.
- D. Prophylaxis is continued for one week after surgery.
- E. Is contraindicated for patients with haemophilia.

A. It should be started at least two hours before surgery.

15. What is the initial dose of heparin in the patients with DVT?

- A. 45 units/kg.
- B. 60 units/kg.
- C. 80 units/kg.
- D. None of the above.

C. Heparin therapy (unfractionated) is administered with an initial bolus IV dose of 80 unit/kg followed by 20 unit/kg/hr. The half life of unfractionated heparin is 60 to 90 minutes. Therefore, continuous IV infusion with PTT monitoring every 4-6 hours is required to double the control.

16. What is the treatment of symptomatic varicose vein of great saphenous vein tributaries with reflux at the saphenofemoral junction?

- A. Sclerotherapy of the sapheno-femoral junction and the varicose tributaries.
- B. Ligation of sapheno-femoral junction and the varicose tributaries.
- C. Surgical bypass.
- D. Compression with elastic stockings.

B. Treatment aims at:

1. Controlling the leak from the deep to the superficial system. For the sapheno-femoral junction, this is achieved by surgical ligation and division. Sclerotherapy is contraindicated in this place because of the risk of escape of the sclerosant material to the deep system and the difficulty of maintaining compression for an adequate time.
2. Getting rid of the varicose tributaries. This is achieved either by sclerotherapy or by excision.

If available, endovenous ablation is currently the treatment of choice, either by radiofrequency or by laser.

17. What is the preferred method of treatment of ulceration due to chronic venous insufficiency?

- A. Compression therapy (elastic stocking).
- B. Saphenous vein ligation and stripping.
- C. Ligation of perforating veins (Linton operation).
- D. None of the above.

A. Graduated-compression elastic stocking is the treatment of choice. Ligation of perforating veins has been largely abandoned due to its association with wound complications.

18. One of the complications of heparin therapy is heparin-induced thrombocytopenia (HIT) which usually occurs:

- A. After 48 hours of starting the heparin therapy.
- B. After 72 hours of starting the heparin therapy.
- C. On the 7 – 8 days following heparin therapy.
- D. 15 days after heparin therapy.

C. HIT occurs after 7 – 8 days of initiation of heparin therapy. It occurs in 20% of patient who are repeatedly treated with heparin. In patients receiving heparin for the first time, its incidence is about 2%.

19. Which of the following is an indication for inferior vena cava (IVC) filter insertion?

- A. Recurrent DVT despite adequate anticoagulation.
- B. Contraindication of anticoagulation in proximal DVT with a suspected one episode of PE.
- C. Pulmonary showering in patients with DVT and moderate pulmonary hypertension.
- D. All of the above.

D. The most important indication for IVC filter in a patient is recurrent DVT in spite of adequate anticoagulation (INR 2–4). The rest of the above indications are also true.

20. Regarding postoperative deep vein thrombosis, all the following are true, except:

- A. Major surgery is a risk factor.
- B. Thrombolytic therapy is contraindicated in the first two days.
- C. Classically, initial treatment is by heparin, followed by oral anticoagulants.
- D. May be followed by chronic lower limb pain.
- E. May be complicated by pulmonary embolism.

B. Thrombolytic therapy is most effective in liquefying a thrombus if it is given within the first two days of its formation.

21. In the first episode of DVT following a major operation, how long should the patient be given warfarin?

- A. 4 weeks.
- B. 6 weeks.
- C. 3–6 months.
- D. One year.

C. The recommended duration is 3–6 months, keeping the INR between 2 and 3. Six-months therapy is advised for proximal DVT cases as shorter periods are associated with higher recurrence rate.

22. The laboratory test that is used for diagnosis of DVT and/or pulmonary embolism is:

- A. D-dimer.

- B. ESR.
- C. Platelet count.
- D. Prothrombin time.
- E. APTT.

A. Elevated D-dimer level occurs with DVT and/or pulmonary embolism. It is one of the fibrin degradation products.

23. The imaging study of choice for the diagnosis of suspected deep vein thrombosis is:
- A. Ascending venography.
 - B. Duplex scan.
 - C. Isotope scan.
 - D. CT angiography.
 - E. MR angiography.

B. Duplex ultrasound is a simple, readily available and safe test. It provides immediate information. It is highly accurate in detecting iliac and femoral DVT, but is less accurate in the diagnosis of soleal sinus thrombosis.

24. About post-phlebitic limb syndrome, all the following statements are true, except:
- A. Iliofemoral thrombosis is more likely to be followed by this syndrome than thrombosis of the soleal sinuses.
 - B. Early treatment of DVT with thrombolytic therapy can obviate this complication.
 - C. There is leg pain and oedema with prolonged standing.
 - D. There is pigmentation and possibly chronic ulcers of the lower leg.
 - E. Treatment is by sapheno-femoral ligation.

E. The underlying problem is the damage of the valves in the deep venous system. Ligation of the sapheno-femoral junction further impairs venous drainage and worsens the condition.

25. Superficial thrombophlebitis can be associated with any of the following, except:
- A. Corticosteroid therapy.
 - B. Venous cannulas.
 - C. Buerger's disease.
 - D. Pancreatic cancer.
 - E. Varicose veins.

A

26. About stripping of the long saphenous vein, all the following statements are true, except:

- A. It is not an essential part of operations for primary varicose veins.
- B. It can cause injury of the saphenous vein.
- C. It can cause injury of the sural nerve.

D. It deprives the patient of a vein that could be used for coronary bypass

C. Commonly the tributaries, rather than the main trunk of the long saphenous, are the ones that become varicose. If the main vein is not dilated, there is no need to remove it. Stripping the long saphenous vein exposes the saphenous nerve to possible injury, but not the sural nerve which is related to the short saphenous vein.

The long saphenous vein is the main source of arterial grafts for femoro-popliteal bypass and for coronary bypass operations.

Choose the single best answer

1. HLA antigens are present on the membrane of:

- A. B lymphocytes.
- B. Monocytes.
- C. Macrophages.
- D. All nucleated cells.

D. The major histocompatibility complex (MHC) is made of a group of genes involved in triggering rejection. They detect the foreign nature of one individual to another within the same species. The MHC is also known as human leukocyte antigen (HLA) system.

2. Rejection on the third post-operative day is considered:

- A. Hyperacute rejection.
- B. Acute rejection.
- C. Chronic rejection.
- D. Accelerated acute rejection.

D. Accelerated acute rejection occurs in the first week of post-transplantation (usually 3-4 days). It is cellular and antibody mediated. It is an immunological memory immune response due to previous exposure to antigen that is present in the donor.

3. What is the most common side effect of sirolimus?

- A. Acute renal failure.
- B. Thrombocytopenia and hyperlipidaemia.
- C. Anaemia.
- D. All of the above.

B. The most common side effects of sirolimus is thrombocytopenia, hyperlipidaemia, neutropenia, and delayed wound healing.

4. What is the cold ischaemic time of the harvested kidney?

- A. 6 hours.
- B. 12 hours.
- C. 24 hours.
- D. 36 hours.

D. The cold ischaemic times of the harvested kidney should be below 36 hours, otherwise delayed graft function incidence increases significantly.

5. Lymphocele following renal transplantation is best treated by:

- A. Observation.
- B. Aspiration.
- C. Laparoscopic peritoneal window creation.
- D. Open exploration and dealing according to findings.

C. Lymphocele is collection of lymph resulting from cut lymphatic vessels of the recipient. It can occur in up to 15% of all recipient patients. Clinically, it appears as a mass compressing the nearby structures for example ureter, iliac vein, and allograft artery. The patient may develop leg swelling on the side of the transplant with hypertension and elevation of serum creatinine. Ultrasonography reveals the diagnosis. The ideal method of treatment is creation of a peritoneal window to allow the fluid to drain into the peritoneal cavity. This could be done laparoscopically or by an open approach.

6. What is the most common cause of liver failure following liver transplantation?

- A. Chronic hepatitis.
- B. Metabolic disease.
- C. Alcoholic cirrhosis.
- D. Bilharzial cirrhosis.

A. Chronic hepatitis is the major cause of liver failure in liver transplant patients. Hepatitis C is the most common cause of chronic hepatitis and cirrhosis followed by hepatitis B.

7. What is the common vascular complication following liver transplantation?

- A. Portal vein thrombosis.
- B. Hepatic artery thrombosis.
- C. Hepatic vein thrombosis.
- D. Inferior vena cava thrombosis.

B. Hepatic artery thrombosis has an incidence of thrombosis of about 5% in post liver transplant patients. The incidence in children is higher (about 10%). Doppler ultrasound is the initial method for diagnosis. Once the diagnosis is established, re-exploration and revision of the anastomosis using interrupted sutures is performed. If liver necrosis has occurred, re-transplantation is indicated.

8. What is the cause of post-transplant lymphoproliferative disease?

- A. Epstein-Barr virus.
- B. Overdose of immunosuppression.
- C. Poor immunosuppression.
- D. None of the above.

A. Epstein-Barr virus is a common cause of post-transplant lymphoproliferative disease. It is a member of the herpes virus family. The patient may present with asymptomatic rise of antibody titres. The most severe presentation of post-transplant lymphoproliferative disorder can present with enlargement of lymph nodes and lymphomatous infiltration. The condition is often fatal.

9. What is the most common indication for liver transplantation in infants?

- A. Biliary atresia.
- B. Wilson's disease.
- C. Tyrosinemia.

D. None of the above.

A. The most common indication for paediatric liver transplant is biliary atresia, which accounts for about 1:10,000 of all births.

10. About preoperative cross-matching between donor and recipient, all the following are true, except?

- A. ABO compatibility is essential for survival of liver transplantations.
- B. ABO compatibility is essential for survival of renal transplantations.
- C. HLA compatibility is essential for survival of liver transplantation.
- D. HLA compatibility is essential for survival of renal transplantation.
- E. HLA compatibility is essential for survival of bone marrow transplantation.

C. ABO blood grouping compatibility is essential for all transplants. The aim is to prevent hyperacute rejection.

HLA cross-matching to ensure compatibility is essential for renal and bone marrow transplantation, and is also important for pancreas transplantation. Histocompatibility provides a better chance of long-term graft survival. The test, however, does not affect the prognosis of liver transplantations.

11. About transplantation terminology:

- A. Autograft is the term that is given when the same individual is the donor and recipient.
- B. Isograft is the term that is given when tissue transfer is from an identical twin.
- C. Allograft is the term that is given when the donor and recipient are genetically dissimilar but of the same species.
- D. Xenograft is the term that is given when the donor and recipient belong to different species (animal to man).
- E. All of the above.

E. Organ xenografting is not clinically applicable. Overcoming the rejection process may make it practical in the future.

12. About graft rejection, one statement only is true:

- A. Treating accelerated acute rejection with increasing immunosuppressive dose is usually successful.
- B. Acute rejection is mediated by humoral immune mechanism.
- C. Acute rejection can be treated with raising the dose of immunosuppressive therapy.
- D. Acute rejection occurs within the first week of transplantation.
- E. Chronic rejection is successfully treated with raising the dose of immunosuppressive therapy.

C. Accelerated acute rejection occurs within the first week, usually within 3-4 days. Its treatment is graft removal.

Acute rejection occurs within a month of the transplant and is mediated by a cellular immune mechanism. Treatment is by giving a high dose of steroids and OKT3. Prognosis is good. Chronic rejection occurs after several months and is an irreversible process that requires re-transplantation.

13. The immunosuppressive agent that is known to cause renal impairment is:
- A. Cyclosporine A.
 - B. Azathioprine.
 - C. Prednisolone.
 - D. Monoclonal antibody OKT3.
 - E. None of the above.

A. Cyclosporine is known to have a nephrotoxic effect. This creates confusion when the renal function deteriorates after renal transplantation. The cause of deterioration may be rejection or the nephrotoxic effect of cyclosporine.

14. Immunosuppressive therapy may increase the incidence of which one of the following malignancies:
- A. Lymphoma.
 - B. Breast cancer.
 - C. Bronchial carcinoma.
 - D. Colon cancer.
 - E. Thyroid cancer.

A. Transplant recipients have a high susceptibility to malignancy that is approximately 100 times that of the normal population. Lymphomas are being the commonest, followed by squamous and basal cell carcinomas of the skin.

15. About the vascular anastomosis in renal transplantation, one statement only is true:
- A. The donor's renal vessels are anastomosed to the recipient's external iliac vessels.
 - B. The donor's renal vessels are anastomosed to the recipient's renal vessels.
 - C. The donor's renal artery is anastomosed to the aorta and the donor's renal vein to the inferior vena cava.
 - D. The donor's renal vessels are anastomosed to the recipient's internal iliac vessels.
 - E. The donor's renal vessels are anastomosed to lumbar vessels of the recipient.

A. The kidney is easily transplanted in the iliac fossa (heterotopic transplantation). It is easy to anastomose its vessels to the external iliacs of the recipient.

16. Regarding liver transplantation, all the following statements are true, except:
- A. For adults liver cirrhosis is the commonest disease for which liver transplantation is performed
 - B. Two transplants can be provided from a single donor liver.

- C. The liver is transplanted in an orthotopic position.
- D. The donor may be cadaver or living related.
- E. Liver transplantation is indicated in patients with advanced hepatocellular carcinoma.

E. End-stage liver failure is the indication for liver transplantation. In adults, its commonest cause is liver cirrhosis. The commonest indication in childhood is biliary atresia.

It is possible to transplant one half of a liver, either the right or the left lobe, because each has its separate arterial, portal, systemic venous and biliary systems. A cadaver liver, therefore, can be used for two recipients. Also, living-related transplantation is possible. The donor can live normally with a half liver. Furthermore, the remaining healthy liver has a remarkable ability for regeneration, thus adding a substantial amount of hepatic cells.

Transplantation for primary liver cancer has a lower survival rate because immunosuppression leads to early recurrence. Patients with advanced disease are not candidates for transplantation. Early HCC cases, however, can sometimes be transplanted, but the selection of such patients is subjected to very strict criteria.

Choose the single best answer

1. How many segments are there in the right lung?

- A. 10.
- B. 9.
- C. 8.
- D. 7.

A. The right lung has 10 segments, while the left lung has 9 segments.

2. What is the most common cancer in the world?

- A. Breast.
- B. Lung.
- C. Gastric.
- D. Thyroid.
- E. Liver.

B. Lung cancer is the most common cancer in the world. Second most common is breast cancer.

3. About bronchial carcinoma all the following statement are true, except:

- A. It more frequently affects males than females.
- B. Persistent cough is the commonest symptom.
- C. Bronchoscopy and biopsy is indicated for all suspected cases.
- D. It predisposes to pneumonia.
- E. CT scan is the imaging study of choice.

C. Male to female ratio is about 10-1.

Bronchoscopy is suitable only for hilar tumours, but the endoscope cannot negotiate its way to a peripheral tumour. For the latter, a CT-guided FNA is indicated.

Obstruction of a bronchus with the tumour may cause atelectasis, pneumonia or lung abscess.

4. About chest tubes, all the following statements are true, except:

- A. To drain a haemo-pneumothorax the tube is inserted in the fifth intercostals space in mid-axillary line.
- B. To drain a haemothorax the tube is inserted in the second intercostal space in mid-clavicular line.
- C. Chest tube insertion can be done under local anaesthesia.
- D. A tube that is inserted to drain a haemothorax is removed when the lung is radiologically inflated and the output is less than 120ml/day.
- E. Tube removal is a bed-side procedure that requires no anaesthesia.

B. The second space in mid-clavicular line is used to drain a pure pneumothorax.

5. The most common anterior mediastinal mass is:

- A. Thymoma.
- B. Pleuropericardial cyst.
- C. Pheochromocytoma.
- D. Neuroblastoma.

A. The most common masses in the anterior mediastinum are thymomas.

6. What is the treatment of choice of small cell lung carcinoma?

- A. Chemotherapy.
- B. Chemotherapy and radiation therapy.
- C. Surgery.
- D. Surgery followed by radiotherapy.

B. Small cell lung carcinoma is generally not treated by surgery. It accounts for about 15-20% of all lung cancers. It is an aggressive form of cancer that metastasizes early. Small cell cancer may obstruct the superior vena cava presenting with superior vena cava syndrome. Treatment is mainly by chemotherapy and radiotherapy. Surgery has a very limited role unless it is accidentally discovered as a peripheral located nodule. If it was resected and proved to be small cell cancer, chemotherapy and radiation should be given.

7. The paraneoplastic syndromes of bronchial cancer include all the following, except:

- A. Cushing-like syndrome due to ACTH secretion.
- B. Water retention due to ADH secretion.
- C. Zollinger Ellison syndrome due to gastrin secretion.
- D. Neuromyopathies.
- E. Hypertrophic pulmonary osteoarthropathy.

C. Bronchial cancer never secretes gastrin.

In addition to the above-mentioned syndromes, bronchial cancer may cause hypercalcaemia due to secretion of parathormone-like substance and may also cause carcinoid syndrome due to serotonin secretion.

8. What is the most common paraneoplastic syndrome occurring in patients with malignant lung lesion, especially small cell carcinoma?

- A. Hypertrophic pulmonary osteoarthropathy.
- B. Hyperpigmentation.
- C. Spider nevi.
- D. None of the above.

A. Hypertrophic pulmonary osteoarthropathy is characterized by swelling and tenderness of the feet, ankles and hands, together with clubbing of the digits. It is due to periostitis of metatarsals and metacarpals and also tibia, fibula and radius bones. It usually shows prior to cancer diagnosis.

9. About Pancoast's tumour, all the following are true, except:

- A. It is the commonest form of bronchial cancer.
- B. The tumour is present in the apex of the lung.
- C. It may cause Horner's syndrome.
- D. It may erode the first rib.
- E. It may invade the lower part of the brachial plexus.

A. The hilar type is the commonest (75%). It arises in one of the main bronchi or their primary divisions.

Pancoast's tumour arises at the apex of the lung. It invades the brachial plexus, sympathetic trunk causing Horner's syndrome, and the first rib.

10. A trauma victim has dyspnoea and a large flail segment of his chest wall due to multiple rib fractures. All the following statements are true, except:

- A. Dyspnoea may be due to paradoxical movement of the chest wall.
- B. Side to side movement of the mediastinum impairs venous return.
- C. Pulmonary contusion is commonly associated with flail chest.
- D. First-aid treatment is external strapping to stabilize the flail segment.
- E. Definitive treatment is by traction on the flail segment until the fractured ribs heal.

E. Definitive treatment is by mechanical ventilation until sticky union of the fractures allows the chest wall to move as one unit. It usually takes about two weeks.

11. All the following are indications for thoracotomy in a trauma victim, except:

- A. Chest tube drains 400ml fresh blood at insertion in the pleural cavity.
- B. Fresh blood drainage that continues at a rate more than 200ml/ hour.
- C. Persistent air leak from the chest tube.
- D. Associated oesophageal injury.
- E. Foreign body in the chest.

A. 400ml of blood at initial tube insertion is not an indication for surgery. What is more important is persistent bleeding. Most bleeding stops spontaneously when the lung inflates. This is because the common source is small pulmonary vessels that have low pressure. Persistent bleeding comes from either the internal mammary vessels or from the aorta and its branches. Persistent air leak indicates injury of a big branch of the bronchial tree, which requires repair.

12. What is the preferred incision to access the thoracic cavity in patients with chest trauma?

- A. Median sternotomy.
- B. Posterolateral thoracotomy.
- C. Anterolateral thoracotomy.
- D. Thoracoscopy.

C. The anterolateral thoracotomy approach is usually used to deal with intra-thoracic injuries. It allows rapid chest entry with the patient in supine position and can also be extended posteriorly if needed.

13. Ductus arteriosus connects:

- A. Pulmonary artery to aorta.
- B. Pulmonary artery to left atrium.
- C. Pulmonary artery to superior vena cava.
- D. None of the above.

A. Ductus arteriosus connects pulmonary artery to the aorta. The duct normally closes 12 hours after birth.

14. What is the most common cardiac tumour?

- A. Myxoma.
- B. Angiosarcoma.
- C. Fibroma.
- D. Desmoid tumour.

A. Cardiac tumours are rare. Benign tumours form 75% of its primary neoplasms. The most common primary cardiac tumour is myxoma, comprising about 60% of all cardiac tumours.

15. Cardiac myxomas are most commonly found in:

- A. Left atrium.
- B. Right atrium.
- C. Left ventricle.
- D. Right ventricle.

A. About 80% of myxomas develop in the left atrium, and less than 20% arise from the right atrium. The tumour rarely arises in the ventricles.

16. What is the most common cause of mitral stenosis?

- A. Congenital.
- B. Coronary artery disease.
- C. Bacterial endocarditis.
- D. Rheumatic heart disease.

D. Rheumatic heart disease is the most common cause of mitral disease. History of rheumatic fever is only obtained in 40% of the patients.

17. The risk factor for the development of coronary artery disease (CAD) is?

- A. Hypertension.
- B. Diabetes.
- C. Hyperlipidaemia.
- D. All of the above.

D. CAD is due to atherosclerosis, which is a patchy disease that could affect any arterial segment. Risk factors include all of the above as well as male gender, smoking and obesity.

18. Left main coronary artery stenosis more than 50% is best treated by?

- A. Medical treatment.
- B. Coronary artery bypass graft surgery (CABG).
- C. Angioplasty and stenting.
- D. All of the above.

B. Patients with severe left main coronary artery disease are best treated by CABG to the left anterior descending (LAD), big diagonal and marginal of the circumflex artery.

19. A more complete and prolonged relief of angina in patients with multiple-vessel disease is achieved by:

- A. CABG.
- B. Coronary artery stenting.
- C. Triple therapy medical treatment.
- D. None of the above.

A. CABG is as safe and effective as percutaneous coronary intervention (PCI), but CABG offers a more complete relief of angina, requires fewer re-interventions and is more durable in diabetics. CABG offers a better survival especially in multivessel disease.

20. About open-heart surgery with the use of a heart-lung machine, all the following statements are true, except:

- A. Good exposure is obtained by an antero-lateral thoracotomy.
- B. A cardioplegic solution that contains potassium is used to slow down cardiac metabolism.
- C. Cooling is done to slow down cardiac metabolism.
- D. The patient must be heparinized.
- E. Postoperative wound pain is a marked feature.

A. These operations are done through a median sternotomy, which gives a good access to the heart and its vessels. Division of the sternum gives the patient marked postoperative pain, particularly with deep breathing and coughing.

21. About coronary artery bypass graft surgery, all the following statements are true, except:

- A. Preoperative coronary angiography is essential.
- B. It is superior to angioplasty + stenting in cases of triple-vessel disease.
- C. The operation is done through a median sternotomy.
- D. The usual vascular graft is the saphenous vein.
- E. Left internal mammary artery anastomosis to the left anterior descending artery provides less patency rates than a saphenous graft.

E. The use of internal mammary artery carries a higher patency rate than a saphenous graft.

22. Pulmonary embolism can cause any of the following, except:

- A. Postoperative fever.
- B. Postoperative tachycardia.
- C. Postoperative dyspnoea.
- D. Postoperative chest pain.
- E. Sudden death.

A. In addition, a small pulmonary embolus may be asymptomatic, while multiple small emboli can cause pulmonary hypertension.

Pulmonary embolism does not cause fever.

23. The differential diagnosis of postoperative pulmonary embolism includes all the following, except:

- A. Pneumonia.
- B. Congestive heart failure.
- C. Myocardial infarction (MI).
- D. ARDS.
- E. Paralytic ileus.

E. The first four choices can give rise to dyspnoea and tachycardia (with chest pain in case of MI). For paralytic ileus to cause dyspnoea distension must be so severe to cause marked elevation of the diaphragm.

24. About the investigations for suspected pulmonary thrombembolism, all the following statements are true, except:

- A. A normal D-dimer level excludes pulmonary thrombembolism.
- B. A normal chest X-ray cannot exclude pulmonary embolism.
- C. CT pulmonary angiography is the most popular imaging study.
- D. The major value of ECG is to differentiate PE from myocardial infarction.
- E. Ventilation-perfusion isotope scan shows lung areas that are perfused but not ventilated.

E. Ventilation-perfusion isotope scan shows lung areas that are ventilated but not perfused. Chest X-ray is normal in 50% of PE patients.

CT pulmonary angiography is the most popular imaging study. This is because it is a good diagnostic tool and is non-invasive as there is no need for vascular catheterization.

25. About postoperative atelectasis, all the following are true, except:

- A. It usually presents by haemoptysis.
- B. Upper abdominal incisions cause more atelectases than lower abdominal incisions.
- C. Atelectasis is one of the causes of postoperative fever.

- D. Dehydration is a predisposing factor.
- E. If neglected may cause pneumonia.

Atelectasis usually presents by fever and tachycardia within the first few days after surgery. In extensive cases the patient may develop dyspnoea. If not timely treated, atelectasis may lead to pneumonia. Thoracic and upper abdominal incisions cause pain on deep breathing and coughing than with other incisions. Atelectasis does not present by hemoptysis.

26. The causes of postoperative fever include the following, except:
- A. Leakage from an intestinal anastomosis.
 - B. Wound infection.
 - C. Paralytic ileus.
 - D. Deep vein thrombosis.
 - E. Atelectasis and pulmonary infection.

C. Paralytic ileus does not cause pyrexia, while the others do.

27. Which one is true for Stanford classification of dissection of the aorta?
- A. Type A – starts in the ascending aorta.
 - B. Type A – starts in the descending aorta.
 - C. Type A – starts in the arch of the aorta.
 - D. Type A spares the ascending aorta.

A. Stanford classification of aorta dissection:

- Type A. Dissection starts in the ascending aorta, and the tear is usually 1 cm above the coronary sinuses.
- Type B. Dissection spares the ascending aorta and the tear starts in the descending aorta, usually just distal to the left subclavian artery.

28. What is the most common symptom in patients with acute type A aortic dissection?
- A. Dyspnoea.
 - B. Severe chest pain.
 - C. Syncope.
 - D. Palpitations.

B. Chest pain radiating to the back is the most common symptom in type A aortic dissection (90%). A high index of suspicion is important especially in younger patients or patients suspicious of having connective tissue disorder. Pain is typically severe and occurs suddenly radiating to the back and abdomen. It is sharp migrating distally with progression of the dissection.

29. What is the most sensitive test used in the diagnosis of acute aortic dissection?
- A. Chest x-ray.
 - B. Cardiac enzymes.

- C. D-dimer.
- D. ECG.

C. D-dimer is a very sensitive test for detection of aortic dissection (about 98%). ECG and elevated cardiac enzymes may also be of help as dissection could involve the coronary ostia and induce myocardial ischaemia and infarction. Chest x-ray may show widening of mediastinum, and this could alert the surgeon that dissection is a possibility.

30. Which one of the following is a complication of type A aortic dissection?
- A. Aortic valve incompetence.
 - B. Myocardial infarction.
 - C. Pericardial effusion and tamponade.
 - D. All of the above.

D. All of the above are complications of type A aortic dissection. Aortic incompetence is due to commissural disruption. Myocardial infarction is due to extension of dissection into the coronary ostia especially the right coronary ostia causing inferior wall myocardial infarction. Serousanguinous pericardial effusion occurs through the thin outer wall of the dissected aorta. Rupture of the ascending aorta is a fatal event.

31. What is the best modality of treatment in uncomplicated descending aortic dissection (Type B Stanford)?
- A. Medical treatment.
 - B. Immediate surgical intervention.
 - C. Endovascular treatment.
 - D. None of the above.

A. It is universally agreed that medical treatment to control hypertension has proved beneficial. Beta blockers (provided there is no contraindication) can be used, as this will control the blood pressure and decrease the force of ventricular contraction.

Choose the single best answer

1. What is the blood supply of the upper ureter?

- A. Aorta and renal arteries.
- B. Lumbar arteries.
- C. Internal iliac artery.
- D. External iliac artery.

A. The blood supply of the upper ureter is derived from the aorta and renal artery.

2. The testicular artery is a branch of:

- A. Aorta.
- B. Renal artery.
- C. Common iliac artery.
- D. External iliac artery.

A. The testicular (spermatic) artery is a branch of aorta. There are 2 testicular arteries that supply the two testes.

3. Hydrocele is a collection of fluid between:

- A. Cremasteric and external spermatic fascia.
- B. Cremasteric fascia and internal spermatic fascia.
- C. The parietal and visceral layers of the tunica vaginalis.
- D. None of the above.

C. Hydrocele develops between the parietal and visceral layer of tunica vaginalis. The visceral layer is adherent to the testis.

4. The right spermatic vein drains into?

- A. The inferior vena cava (IVC).
- B. The right renal vein.
- C. The right inferior epigastric vein.
- D. None of the above.

A. The right spermatic vein drains into the IVC while the left spermatic vein drains into the left renal vein.

5. A patient with complete urethral injury following a severe road traffic accident is best treated by:

- A. Insertion of a Foley catheter for 6 weeks.
- B. Insertion of a Foley catheter for 4 weeks.
- C. Urgent surgical repair of urethra.
- D. Suprapubic catheter insertion.

D. The placement of suprapubic catheter is advised in complete tear. Surgical repair is deferred for 6-8 weeks.

6. What is the initial management of priapism?

- A. Pain-relieving drugs and hydration.
- B. Beta blockers.
- C. Alfa blockers.
- D. Placement of 16-18 g IV catheter into the corpus cavernosum.

D. Emergency placement of large-gauge catheter (18-gauge) into the lateral aspect of one of the corpora cavernosa and aspiration and irrigation of both corpora through the communicating channel with oral administration of pseudoephedrine could be of some help. This aggressive treatment is necessary to preserve erectile function.

7. A hard mass in the testes in a 30-year-old male is best diagnosed by:

- A. Core needle biopsy.
- B. Fine needle aspiration cytology.
- C. Orchiectomy.
- D. Open biopsy and frozen section.

C. Percutaneous biopsy in testicular masses is contraindicated due to the high risk of seeding of the scrotal wall. Most testicular masses are malignant, so orchiectomy is the best way of diagnosis and treatment. Some advocate open biopsy by delivering the testicles through the inguinal canal.

8. In patients with extensive scrotal gangrene, the testicles are:

- A. Usually also affected.
- B. Should be resected, as the testicles will eventually get gangrenous.
- C. Are usually not involved and can be transposed in a pouch in the thigh.
- D. None of the above.

C. Proper debridement and excision of all necrotic scrotal tissue under an umbrella of broad-spectrum antibiotics should be performed. The testicles have separate blood supply (testicular artery from the aorta) and are not affected and can be put subcutaneously in the thigh.

9. Paraphimosis is a condition in which:

- A. There is inability to retract the foreskin.
- B. Inability to reduce the foreskin after it has been retracted.
- C. Gangrenous infection of the foreskin.
- D. None of the above.

B. This is a condition in which the foreskin has been retracted for long period of time, and the patient is unable to reduce it back causing constriction of the glans penis. The results are pain and oedema of the glans. If condition is not treated early, glans necrosis may occur.

10. The patients with benign prostatic hyperplasia (BPH) are initially best treated by:
- Beta blocker.
 - Beta stimulants.
 - Alpha blockers.
 - Alpha stimulants.

C. Alpha blockers are the best initial medical treatment for BPH. They act on alpha receptors in the prostatic smooth muscle, thus decreasing its tone. Another group of drugs is the 5 alpha reductase inhibitors that inhibit production of dihydrotestosterone. They shrink the prostate over a few months, thus improving symptoms of BPH.

11. Alpha fetoprotein and chorionic gonadotropin are elevated in:
- Seminomas.
 - Non-seminoma germ cell tumour.
 - In Sertoli cell tumour.
 - None of the above.

B. Tumour markers (alpha-fetoprotein and chorionic gonadotropin) are almost always elevated in non-seminomatous germ cell tumours (teratomas).

12. A longstanding urinary stone may increase the risk of which one of the following types of carcinoma?
- Transitional cell carcinoma.
 - Squamous cell carcinoma.
 - Adenocarcinoma.
 - None of the above.
 - All of the above.

B. Generally, the most common type of bladder carcinomas in the Western world is transitional cell carcinomas (TCC). The patients with chronic bladder irritation such as stones or Schistosomiasis are at risk of developing squamous cell carcinoma (SCC), which is more aggressive than TCC.

13. After transurethral resection of superficial TCC, local bladder instillation of which of the following is recommended to decrease the risk of recurrence?
- Cis-platinum.
 - Methotrexate.
 - BCG (Bacille Calmette and Guérin) vaccine.
 - Adriamycin.

C. BCG or mitomycin C can be given intravesically in high-risk patients who are liable for recurrence or progression of the disease. BCG induces effective immune antitumour response while mitomycin C acts by its direct cytotoxic effect.

14. In patients with hypernephroma (renal cell carcinoma) with IVC tumour thrombus are best treated by:

- A. Chemotherapy.
- B. Radiotherapy.
- C. Chemotherapy and radiotherapy.
- D. Open surgery.

D. In about 5-10% of hypernephroma patients, the tumour invades the lumen of the renal vein and the IVC. The tumour thrombus is usually not adherent to the vein wall. Venotomy and extraction of the thrombus after clamping the IVC above and below the thrombus is performed. If the thrombus extends high up to the right atrium, cardiopulmonary bypass should be used and total circulatory arrest is performed to achieve a complete bloodless field.

15. What is the most common urinary diversion procedure that is performed following total cystectomy?

- A. Rectal bladder.
- B. Ileal conduit.
- C. Cutaneous (ureterostomy).
- D. None of the above.

B. A segment of vascularized ileal segment is isolated. The ureters are anastomosed to one end of this loop, while the other end is brought as a stoma to the outside. The stoma is fitted with an appliance to collect urine.

16. Injury of the ureter is least likely to occur during one of the following operations:

- A. Abdomino-perineal resection of rectal cancer.
- B. Small intestinal resection.
- C. Total hysterectomy.
- D. Left hemicolectomy.
- E. Dormia basket removal of ureter stone.

B. Injuries of the ureters are iatrogenic in the great majority of cases. Except for small intestinal resection, the rest are operations during which the ureters are at risk of injury.

17. Which histologic-proven renal cell carcinoma has worst prognosis?

- A. Chromophobe CA.
- B. Clear cell CA.
- C. Papillary CA.
- D. All of the above.

A. Collecting duct CA has the worst prognosis and poorly respond to chemotherapy.

18. About intravenous urography (IVU), all the following statements are true, except:

- A. It is not suitable for patients who are in renal failure.
- B. It provides morphological and functional information about the kidney.

- C. On a normal IVU the ureters pass down on the transverse processes of lumbar vertebrae 2-5.
- D. It is the imaging of choice for diagnosis of suspected renal tumours.
- E. Emergency IVU can be done for patients in acute renal colic.

D. IVU provides morphological information about the kidneys, ureters and bladder such as strictures, dilatations and filling defects. It also provides a rough idea about the separate functions of each kidney. In a normal kidney a renal blush (contrast that is filtered in the cortical tubules) shows within one minute of IV injection of the contrast. The calyces and renal pelvis start to appear within five minutes and the ureters start to show at 10-13 minutes of injection. In a kidney with impaired function these intervals are prolonged. The delay is roughly proportionate to the degree of renal functional impairment.

CT is far better than IVU in the diagnosis and staging of renal tumours.

Emergency IVU is useful in the diagnosis of patients with renal colic, though this is now superseded with CT scan (without contrast), which is better able to detect small stones. Another alternative is abdominal ultrasound $\pm$ plain X-ray.

19. About polycystic kidney disease, all the following statements are true, except:

- A. It is an X-linked recessive disease.
- B. The disease is always affects both kidneys.
- C. The disease is always progressive.
- D. The disease causes hypertension.
- E. The disease ultimately causes renal failure.

A. It is an autosomal dominant disease.

20. A 49-year old man had haemorrhoidectomy. After recovery from anaesthesia he complains of painful inability to pass urine. The first step is:

- A. Administration of alpha 1 reductase inhibitor.
- B. Administration of parenteral analgesia.
- C. Evacuation of the urinary bladder with a catheter then removal of the catheter.
- D. Placement of a self-retaining catheter and investigation of the possible cause.
- E. Urgent suprapubic cystostomy.

B. Post-haemorrhoidectomy acute retention of urine is a reflex action to anal pain. Analgesia usually solves the problem. It should be the first step of management.

21. Five hours after she was hit by a car, a 32-year-old woman presents to the emergency room complaining of left flank pain and gross haematuria, she is haemodynamically stable. The next step in management is:

- A. Exploratory laparotomy.
- B. Diagnostic peritoneal lavage.
- C. Intravenous urography.
- D. Triple contrast CT scan of the abdomen.
- E. Blood transfusion.

D. Abdominal trauma victims are divided into categories.

- Haemodynamically unstable or those with frank peritonitis. These should have emergency resuscitation and laparotomy.
- Haemodynamically stable with local abdominal symptoms and signs that are suggestive of an internal injury. These should be admitted to hospital under observation and are subjected to diagnostic peritoneal lavage, abdominal ultrasound or triple contrast CT (oral, IV and rectal contrasts). CT is the best.
- Haemodynamically stable with no local abdominal manifestations. These are discharged home, provided there are no injuries elsewhere.

In this case there is suspicion of left renal injury. Diagnostic peritoneal lavage (DPL) is not suitable as the haematoma is usually restricted to the retroperitoneal space. DPL can detect new intraperitoneal blood and intestinal content.

The majority of isolated renal injuries do not require surgery. Haematuria tends to stop spontaneously because of the tamponade effect of the posterior peritoneum. Admission to hospital and follow up for vital signs, local signs, haematocrit and urine colour are recommended. Blood transfusion is given when there is evidence of major blood loss; in the described case it is not indicated.

22. If a renal-injury patient goes to surgery, the preferred incision is:

- A. Lumbar incision.
- B. Midline abdominal incision.
- C. Thoracoabdominal incision.
- D. Iliac incision.
- E. Laparoscopic approach.

B. An anterior approach through a long midline incision allows exploration of the whole abdomen for associated injuries, and dealing with them.

23. The treatment of metastatic prostate cancer is:

- A. Luteinizing hormone-releasing hormone (LRH) agonist.
- B. External radiotherapy.
- C. Interstitial radiotherapy (brachytherapy).
- D. Radical prostatectomy.
- E. Corticosteroid therapy.

A. For metastatic prostate cancer the choice is hormonal therapy with either bilateral orchiectomy or luteinizing hormone releasing hormone agonists.

Radical prostatectomy and radiotherapy are chosen for tumours that are localized to the prostate.

24. About testicular malignancies, one statement only is true:

- A. These are the commonest malignant tumours in males.
- B. Percutaneous scrotal biopsy should be avoided.
- C. They are usually resistant to chemotherapy.
- D. In a seminoma, alpha fetoprotein is elevated.

- E. A seminoma spreads to inguinal lymph nodes.

B. In prevalence, lung and prostate cancers far exceed those of the testis in males. Alpha fetoprotein is elevated with teratomas rather than seminomas. Lymphatic spread is directed upwards towards the para-aortic lymph nodes. Spread to the inguinal nodes may happen if the tumour invades the scrotal skin, which is rare. Trans scrotal biopsy is contraindicated as it opens the way to scrotal skin invasion.

25. The commonest symptom of a renal cell carcinoma is:

- A. Renal colic.
- B. Varicocele.
- C. Abdominal mass.
- D. Jaundice.
- E. Haematuria.

E. Haematuria is present in 60% of cases. It is classically described as being painless, recurrent, profuse and total haematuria.

Pain is the next common symptom. It may be due to stretch of the renal capsule by the neoplasm, passage of blood clots causing ureteric colic or by infiltration of adjacent lumbar nerves causing referred pain.

A renal mass is the least frequently seen of the triad "haematuria, pain and mass"

Secondary varicocele is a rare complication of renal cell carcinoma. It is caused by occlusion of the testicular vein by tumour growth in the inferior vena cava or in the left renal vein.

26. About incomplete descent of the testis, only one statement is true:

- A. It is always unilateral.
- B. Its commonest position is intra-abdominal.
- C. Surgical treatment should be postponed until the child grows up beyond the age of 5 years.
- D. A short vas deference is the main obstacle against elongation of the spermatic cord at surgery.
- E. Orchidopexy does not obviate the risk of malignancy.

E. One third of cases are bilateral. The commonest position is the neck of scrotum, while the least common is the intra-abdominal testis. Orchidopexy should be done between the ages of 6-12 months. Early surgery preserves the spermatogenic function of the testis but does not reduce the risk of malignant transformation.

The difficulty in mobilizing the testis down to the scrotum usually arises from a short testicular artery.

27. One of the following symptoms is specific to urinary bladder cancer:

- A. Haematuria.
- B. Burning micturition.
- C. Pneumaturia.
- D. Necroturia.

E. Frequency.

D. Necroturia is the passage of pieces of whitish tissue representing necrotic tumour. It is a specific symptom for urinary bladder cancer.

28. One of the following urinary tumours is multicentric:

- A. Renal cell carcinoma.
- B. Nephroblastoma.
- C. Transitional cell carcinoma (TCC).
- D. Squamous cell carcinoma (SCC).
- E. None of the above.

C. TCC is commonly multicentric. This is why when it affects the kidney, its ureter is removed with it, together with a cuff of surrounding bladder wall. This is also why follow-up is very important.

29. Urinary Schistosomiasis causes all the following, except:

- A. Lower ureters stricture.
- B. Bladder neck obstruction.
- C. Chronic cystitis.
- D. Urinary bladder cancer.
- E. Squamous cell carcinoma of renal pelvis.

E. Schistosomiasis is not a disease of the kidneys. The main brunt of the disease is in the urinary bladder and the ureters, particularly their lower ends.

30. A 14 year old boy presents with acute pain and swelling of the scrotum for the last two hours. On examination, the right side of the scrotum is swollen and tender. The cremasteric reflex is absent. The next step is:

- A. Urgent surgery on the right compartment of the scrotum.
- B. Urgent surgery on both sides of the scrotum.
- C. Fine needle aspiration cytology.
- D. Intravenous antibiotics.
- E. Non-steroidal anti-inflammatory agents.

B. This is the classic picture of testicular torsion. Treatment is urgent surgery because every hour counts. Delay is likely to result in gangrene of the testis. The best results are obtained if surgery is done within six hours of the start of torsion.

If Duplex ultrasound is readily available it would be valuable in confirming the diagnosis provided it wouldn't delay surgical intervention.

The right side of the scrotum is explored. If the testis is viable it is untwisted and is then fixed to the scrotum with nonabsorbable sutures to prevent recurrent torsion. This is called orchidopexy. If the testis is gangrenous, orchidectomy is done. Left orchidopexy should also be done because the predisposing factor to torsion may be bilateral.

Choose the single best answer

1. Fracture of calcaneus bone is usually associated with:
- Fracture or dislocation of the hip.
 - Fracture of femur.
 - Tibial fracture.
 - Spine fracture.

D. Calcaneal fractures are mostly associated with falls from height and this is usually associated with spine fractures.

2. Compartment syndrome is best diagnosed by:
- Measurement of the compartment pressure.
 - Compartment pressure of 10 mmHg higher than the diastolic pressure.
 - Tense tender extremity.
 - Severe pain and painful passive stretch of the compartment muscles.

D. Measurement of the compartment pressure is not totally reliable. Diagnosis of compartment syndrome is mainly based on clinical grounds. Painful passive stretch of the compartment muscles and severe disproportionate pain are diagnostic.

3. What is the preferred treatment of Monteggia fracture?
- Closed reduction of both radius and ulna under anaesthesia.
 - Open reduction of both radius and ulna.
 - Open reduction and fixation of the ulna and closed reduction of radius.
 - Open reduction and fixation of both radius and ulna.

C. This is a combination of fracture of shaft of ulna and dislocation of the head of radius. Best results are obtained by internal fixation of the ulna and closed reduction of the radius. Late re-dislocation of the radial head is not uncommon.

4. Mid shaft fracture of femur in a 5-year-old child is best treated by:
- Traction.
 - Closed reduction and spica cast.
 - Open reduction and internal plate fixation.
 - Open reduction and intramedullary nail fixation.

B. Fracture of mid shaft femur in pediatric patients (less than 7 years) are best managed by spica cast. Minor angulation is accepted.

5. In a driving accident, what is the most common cervical vertebral fracture?
- Odontoid fracture.
 - C2 fracture.
 - Compression fracture (C3-C7).
 - Burst fracture (C3-C6).

D. Burst fracture of the cervical spine is the most common fracture in motor accident.

6. Ideal initial treatment for symptomatic osteoid osteoma of distal femur is:

- A. Anti-inflammatory medication.
- B. Ultrasound radiofrequency ablation.
- C. Local resection.
- D. None of the above.

A. The aetiology of the osteoid osteoma is not certain. It is a benign lesion that affects young age (10-20 years) and appears on x-ray as dense cortical sclerosis. Clinically, the patient complains of severe localized pain. Pain is dramatically relieved by aspirin. The lesion usually regresses spontaneously.

7. A 72 year old woman fell on outstretched arm. This was followed by pain and by swelling above the wrist. Plain X-ray showed fracture of the distal radius. About this fracture, all the following statements are true, except:

- A. This is called Colles' fracture.
- B. There is anterior displacement and angulation of distal fragment.
- C. There is radial displacement and angulation of distal fragment.
- D. Osteoporosis is the usual predisposing factor.
- E. The majority of these cases are treated by closed reduction, and immobilization in a plaster cast.

B. Breaking a fall with an outstretched arm fractures the lower radius. The distal fragment is displaced and angulated posteriorly. This is called Colles' fracture. The resulting deformity is likened to a dinner fork. There are also radial deviation and angulation; and impaction of the distal fragment. Falling on a flexed wrist is less frequent and causes fracture in the same place but with anterior displacement of the distal fragment. This is called Smith's fracture. Osteoporosis is usually present in Colles' fracture patients.

The majority are treated conservatively. Open reduction and internal fixation are indicated in a few cases where closed reduction of a significant deformity is not successful.

8. A 74 year old man tripped on a step. He fell down and is unable to stand up. He has pain in the right hip. The whole right lower limb is abducted and externally rotated. The most likely diagnosis is:

- A. Fracture of the neck of right femur.
- B. Posterior hip dislocation.
- C. Central hip dislocation.
- D. Fracture of the superior pubic ramus.
- E. Fracture of the shaft of femur.

A. Fracture of the neck of femur is frequently seen in the elderly because of osteoporosis. It can follow trivial trauma as the one that is described here. Osteoporosis predisposes to:

- Spine fracture, usually of the wedge compression type.
- Colles' fracture.
- Fracture of neck of femur.

9. Which one of the following fractures is known to cause bone necrosis?

- A. Fracture of scaphoid bone.
- B. Fracture of the shaft of a metacarpal bone.
- C. Fracture of shaft of humerus.
- D. Fracture of inferior pubic ramus.
- E. Fracture of shaft of femur.

A. Blood supply of the scaphoid bone flows from its distal to its proximal end. A fracture in its middle (waist of scaphoid) interrupts the blood supply and causes necrosis of its proximal part. Another fracture that is known to produce bone necrosis is the displaced intracapsular fracture of the neck of femur. It causes necrosis of the head.

10. All the following are possible complications of supracondylar fractures of the humerus, except:

- A. Injury of the brachial artery.
- B. Malunion that causes cubitus varus deformity.
- C. Injury of the musculocutaneous nerve.
- D. Injury of the median nerve.
- E. Post-traumatic ossification that causes elbow stiffness.

A. This is a frequently-seen fracture in childhood. The extension type accounts for 80% of cases. The musculocutaneous nerve is not injured as it ends in the middle of the arm.

11. About complications of fractures, all the following statements are true, except:

- A. Fracture of the shaft of humerus can cause wrist drop.
- B. Fracture of the medial epicondyle of humerus can cause claw hand deformity.
- C. Fracture of the surgical neck of humerus can cause atrophy of deltoid muscle.
- D. Extracapsular fracture of neck of femur can cause necrosis of its head.
- E. Supracondylar fracture of the femur can cause popliteal artery injury.

D. A fracture of the shaft of femur can injure the radial nerve as it lies posteriorly in the spiral groove. This causes wrist drop due to paralysis of wrist extensors. The ulnar nerve is prone to injury with fractures of the medial epicondyle. This produces clawing of the medial two fingers as the corresponding lumbrical muscles are paralysed. The circumflex (axillary) nerve passes posterior to the surgical neck of humerus. Its fracture can cause nerve injury with consequent paralysis and atrophy of the deltoid muscle. The capsule of hip joint is an important landmark in the prognosis of femoral neck fractures. An extracapsular fracture does not affect the vascularity of the neck. An intracapsular fracture, however, can interrupt its blood supply and cause head necrosis if it is markedly displaced. Therefore for necrosis of head of femur to occur, the fracture should be intracapsular and displaced.

Supracondylar fractures of the femur can injure the popliteal artery and cause acute ischaemia and blood loss.

12. Internal fixation is indicated for all the following fractures, **except**:

- A. Extracapsular fracture of neck of femur.
- B. Ankle fractures.
- C. Supracondylar fracture of the femur with popliteal artery injury.
- D. Fracture of the shaft of femur in an adult.
- E. Compound fracture of the tibia.

E. Femoral neck fractures usually affect elderly people who have osteoporosis. Internal fixation will allow them early mobilization and reduces the risks of venous thrombosis, chest infection and decubitus ulcer formation.

Ankle fractures are indicated for open reduction and internal fixation in order to avoid any irregularity of the articular surface, a condition that causes chronic pain in this weight-bearing joint.

As a general rule arterial repair requires rigid fixation of the fracture that caused it. Otherwise, the vascular repair is threatened by failure.

The femoral shaft is surrounded by strong muscles that can re-displace the fracture if it is fixed in plaster. Traction requires lying down in a hospital bed for a long time. Internal metal fixation solves these problems.

Internal fixation is generally contraindicated in cases of compound fractures. These fractures are contaminated. The insertion of a metal prosthesis in such a wound promotes infection. If rigid immobilization is required, external metal fixation is a suitable alternative.

13. The least possible complication of an unstable fracture of the pelvis is?

- A. Severe bleeding.
- B. Urinary bladder injury.
- C. Injury of the urethra.
- D. Malunion that causes future obstruction of the birth canal.
- E. Femoral nerve injury.

E. The femoral nerve is unlikely to be injured in this case.

14. Fat embolism is most likely to follow fracture of:

- A. Ribs.
- B. Shaft of femur.
- C. Maxilla.
- D. Tarsal bones.
- E. Clavicle.

B. Fat embolism is a rare complication of fractures of long bones, because they contain yellow marrow (fat). The symptoms usually appear 1-3 days after the fracture. The common ones are dyspnea and petechial rash.

15. About Pott's disease of the spine, all the following statements are true, except:
- This is tuberculous osteomyelitis of the spine.
 - It is a disease of childhood.
 - Bones show bone destruction without new bone formation.
 - A cold abscess may show as a swelling in the thigh.
 - Treatment is mainly surgical.

E. The common site of Pott's disease is the lower dorsal spine. The disease affects two or three adjacent vertebrae and the discs between them. There is bone destruction without new bone formation.

Pott's disease triad is:

- Cold abscess, which may trickle along the psoas sheath to form a fluctuant swelling in the femoral triangle.
- Kyphosis.
- Paraplegia (10-15% of cases).

The treatment of tuberculosis, anywhere in the body, is mainly medical by anti-tuberculous drugs.

16. About osteosarcoma, all the following statements are true, except:

- This is the second common primary malignancy of bones.
- The peak age is in childhood.
- Paget's disease is a predisposing factor.
- It arises from the metaphysis of the growing end of a long bone.
- The commonest site is the lower end of femur.

A. Osteosarcoma is the most common primary bone cancer. The peak age is in childhood. A lower peak is for the elderly who have Paget's disease of bone. Another less common predisposing factor is exposure to irradiation.

The tumour arises from the metaphysis of a long bone. The most frequent site is the lower end of femur.

17. About osteosarcoma, one statement only is true:

- The tumour is purely osteolytic.
- The tumour does not invade the neighboring soft tissues.
- Haematogenous spread goes mainly to the liver.
- Pain is the main symptom.
- Alfa fetoprotein is elevated.

D. Osteosarcoma exhibits both bone destruction and new bone formation. It is a highly malignant tumour that invades surrounding tissues and metastasizes to the lungs. Pain is the main symptom, and is particularly worse at night. A swelling may also be present. There is no specific tumour marker. Definitive diagnosis depends on adequate biopsy that is taken by an orthopedic surgeon.

18. About osteosarcoma, all the following statements are true, except?

- A. Plain X-ray shows Codman's triangle.
- B. Definitive diagnosis rests on a combination of clinical and radiographic findings.
- C. Wide excision is the main treatment of early cases.
- D. Limb salvage is possible in early cases.
- E. Chemotherapy improves outcome of treatment.

B. Codman's triangle is subperiosteal bone deposition that is formed when the periosteum is raised by the tumor.

For the treatment of early cases wide excision with a safety margin, in all directions, is indicated. This may amount, in some cases, to amputation of the limb. However, in small tumours, limb salvage (preservation) by inserting a prosthesis in place of the excised bone, is possible.

Before doing this major, and possibly mutilating, surgery, adequate bone biopsy should be obtained to confirm the diagnosis.

The addition of chemotherapy improves the outcome. The trend is to give it before the operation (neoadjuvant chemotherapy). A combination of methotrexate, adriamycin and cisplatin is used.

19. About giant cell tumours of bone, which one statement is true?

- A. It usually arises from the shaft of a long bone.
- B. It affects elderly people.
- C. The tumour is always highly malignant.
- D. It does not invade the articular cartilage of the nearby joint.
- E. Radiographically, it shows both bone destruction and new bone formation.

A. A giant-cell tumor of bones accounts for 4-5% of primary bone tumors. It usually arises from the epiphysis at the growing end of a long bone; though it may arise in other bones as the mandible. The usual sites are the lower end of femur, upper ends of tibia or fibula, upper end of humerus and lower ends of radius and ulna.

The tumour affects young adults in the third and fourth decade.

Giant cell tumours are usually benign though they may exist in a wide range of aggression. The malignant form is rare.

A characteristic feature is that it respects the articular cartilage. The tumour is also sharply demarcated.

On plain X-ray, it shows as an osteolytic area with sharp demarcation and no bone formation.

20. About giant cell tumours of bone, all the following statements are true, except:

- A. It may be multilocular.
- B. The main symptom is pain.
- C. It can cause pathological fracture.
- D. The cut section of the tumour is reddish brown.
- E. Treatment is by wide resection with a safety margin, followed by chemotherapy.

E. The cut section of the tumour shows a characteristic reddish brown (maroon) colour. Surgery is the treatment of choice and curettage is the preferred technique.

21. Which one of the following malignancies can give rise to osteosclerotic bone metastases?

- A. Prostate cancer.
- B. Renal cell carcinoma.
- C. Bronchial cancer.
- D. Follicular carcinoma of the thyroid.
- E. Neuroblastoma of the adrenal.

A. Prostate cancer can give rise to osteolytic or osteosclerotic bone metastases. The others produce osteolytic metastases only.

22. About bone metastases, all the following statements are true, except:

- A. They can cause spinal cord compression.
- B. They can cause hypercalcaemia.
- C. Alkaline phosphatase is elevated.
- D. Whole body scan for deposits is done by MRI.
- E. Biphosphonates reduce the incidence of pathological fractures in these patients.

D. The whole body is searched for bone deposits by isotope scan. Metastases appear as hot spots.

Choose the single best answer

1. What is the most common spinal cord tumour in adults?

- A. Ependymoma
- B. Astrocytoma
- C. Ganglioneuroma
- D. Osteoblastoma

A. Ependymomas constitute 40-60% of these tumours.

2. What is the most common malignant brain tumour in children?

- A. Neuroblastoma
- B. Medulloblastoma
- C. Ganglion neuroma
- D. Astrocytoma

B. Medulloblastoma is the most common malignant brain tumour in children. It usually occurs in the first decade of life.

3. Brain metastases arise most commonly from:

- A. Breast
- B. Lung
- C. Stomach
- D. Kidney

B. The origin of brain metastases is mostly from the lung, followed by the breast and kidney. Metastases reach the brain by haematogenous spread.

4. What is the most common primary malignant brain tumour in adults?

- A. Astrocytoma
- B. Ependymoma
- C. Ganglioglioma
- D. Oligodendroglioma

A. Astrocytoma is by far the most common primary malignant brain tumor. Astrocytomas are graded from I to IV, and grade I and II are low grade astrocytomas.

5. A patient is confused and opens his eyes to painful stimuli and localizes pain has a Glasgow coma score of (GCS)?

- A. 8
- B. 10
- C. 11
- D. 12

C. GCS is calculated by adding the score of the responses of the patient in each three categories. Verbal score 1-5, motor score 1-6, eyes opening 1-4. This patient's best verbal response is 4, his best motor response is 5 and his eye opening is 2. The total is 11.

6. Fractures of the anterior cranial fossa may be associated with any of the following, except:

- A. Injury of olfactory nerve.
- B. Injury of oculomotor nerve.
- C. Injury of abducent nerve.
- D. Subconjunctival haematoma.
- E. CSF otorrhoea.

E. Escape of CSF from the ear indicates a middle cranial fossa fracture. With anterior cranial fossa fractures CSF may leak out from the nose (CSF rhinorrhoea).

7. About intracranial pressure (ICP), all the following are true, except:

- A. A rise in ICP in a trauma victim is indicated by diminishing Glasgow Coma Scale.
- B. A rise in ICP in a trauma victim is an indication for urgent surgery.
- C. Ensuring adequate oxygenation can reduce a high ICP.
- D. Diuretics can reduce a high ICP.
- E. ICP can be monitored by introducing a catheter/transducer through a burr hole.

B. Raised ICP is the commonest cause of death in neurosurgical patients. It is extremely common in patients suffering from head injury. Deteriorating level of consciousness is an indication of rising intracranial pressure.

In a head-injury victim intracranial hypertension may be caused by:

- Intracranial haematoma. This requires surgical evacuation and haemostasis.
- Cerebral oedema. This is treated conservatively. Most important is to ensure adequate oxygenation, which may require mechanical ventilation. Diuretics are also helpful.

8. In a trauma victim ecchymosis behind the ear is an indication of:

- A. Fracture of posterior cranial fossa.
- B. Temporal skull fracture.
- C. Fracture of anterior cranial fossa.
- D. None of the above.

A. Ecchymosis over the mastoid process is called Battle's sign. It indicates posterior cranial fossa fracture.

9. About extradural haematoma, all the following statements are true, except:

- A. It usually arises from injury of the middle meningeal artery.
- B. It causes progressive deterioration of conscious level.
- C. It causes weakness on the opposite side of the body.
- D. It causes pupillary dilatation with no response to light on the same side.

E. It shows as a concavo-convex opacity on CT scan.

E. An extradural haematoma shows as a biconvex opacity on CT scan. It commonly causes midline shift.

10. In radial nerve crush injury, the most appropriate treatment is:

- A. Immediate exploration and repair.
- B. EMG two weeks after injury and surgical intervention is indicated if the nerve conduction is not improved.
- C. Surgical intervention in 12 weeks if no improvement occurs.
- D. None of the above.

C. Closed peripheral nerve injuries should be observed and EMG should be done 4 weeks after injury. If conduction is improving, continuous observation is indicated. Surgical exploration and correction are indicated if there is no improvement after 12 weeks. Electrical testing during surgery should be done and if there is no conduction, end-to-end anastomosis should be performed. If the gap is big a nerve graft is needed.

11. What is the most common peripheral nerve tumour?

- A. Schwannoma.
- B. Neurofibroma.
- C. Neuroepithelioma.
- D. Solitary sarcoma.

A. Schwannoma is the most common peripheral nerve tumour. It is a benign tumour that is also called neurilemmoma. A schwannoma arises from Schwann cells that form myelin in the peripheral nerves. It is tender and painful.

12. What is the origin of the sympathetic nervous system?

- A. Thoracolumbar spinal segment.
- B. Spinal segments S3, S4.
- C. Cranial nerves III, VII, X.
- D. None of the above.

A. The sympathetic system arises from the thoracolumbar spinal segments T1 to L4. It drives the fight response, promoting epinephrine to increase the heart rate and contractility and raises blood pressure and increases blood glucose.

13. What is the origin of the parasympathetic nervous system?

- A. Cranial nerves I, II and VII.
- B. All Thoracic spinal cord segments.
- C. The upper 4 lumbar spinal segments.
- D. All lumbar segments and first sacral segment.
- E. None of the above.

Choose the single best answer

1. What is the life time of circulating platelets?

- A. 5 days.
- B. 1 month.
- C. 20 days.
- D. 10 days.

D. The expected life of circulating platelets is 10 days.

2. The patients with factor V Leiden mutation are more liable to develop DVT than normal population. What is the reason?

- A. Inadequate production of factor V.
- B. Inability to inactivate factor V.
- C. Overproduction of factor V.
- D. None of the above.

B. Patients with factor V Leiden mutation have a variant of factor V that the body is unable to inactivate. They are more liable to develop DVT especially in long-hour flights. Factor V Leiden mutation is either heterozygous or homozygous. With heterozygous disease, the patients are 7-10 times more susceptible to develop DVT. Homozygous mutation patients should be anticoagulated for life.

3. The most frequent hereditary bleeding disorder is:

- A. Haemophilia A.
- B. Haemophilia B.
- C. von Willebrand disease.
- D. Immuno-genic thrombocytopenic purpura.
- E. Thrombasthenia.

C. von Willebrand disease is the most frequent hereditary bleeding disorder where the von Willebrand factor is deficient. This factor is important for platelet aggregation.

4. Hemophilia B is due to deficiency of:

- A. Factor V.
- B. Factor IX.
- C. Factor XI.
- D. Factor VIII.
- E. Factor X.

B. Haemophilia B (Christmas disease) is caused by deficiency of factor IX. It is the second common form of haemophilia, preceded only by haemophilia A (Factor VIII deficiency).

5. Which of the following is the best treatment for thrombasthenia?

- A. Factor VII.

- B. Fresh frozen plasma (FFP).
- C. Factor V.
- D. Platelet transfusion.

D. Thrombasthenia is a rare autosomal recessive condition that is characterized by faulty platelet aggregation, but their count is normal. This rare condition must be treated by platelet transfusion.

6. What is the first choice treatment in patients with idiopathic thrombocytopenic purpura (ITP)?

- A. Splenectomy.
- B. IV immunoglobulin.
- C. Desmopressin.
- D. Platelet transfusion.

B. First treatment of choice is IV immunoglobulin and corticosteroids, and the second choice of treatment is splenectomy.

7. About heparin, all the following statements are true, except:

- A. Unfractionated heparin needs monitoring of activated partial thromboplastin time.
- B. Excess bleeding from heparin overdose is treated by protamine sulphate.
- C. Prolonged administration may cause osteoporosis.
- D. Heparin may cause thrombocytosis.
- E. Low molecular weight heparin can be given without monitoring the coagulation tests.

D. Actually, heparin administration may cause marked reduction of platelet count, the so called heparin-induced thrombocytopenia.

8. Which one of the following increases the warfarin effect and raises INR?

- A. Ibuprofen.
- B. Aspirin.
- C. Cephalosporin.
- D. All of the above.

D. All of the above increase the effect of warfarin and rises INR.

9. A patient receiving warfarin therapy presents for parotid tumour surgery and his laboratory finding showed INR of 2.3. What would be the appropriate treatment?

- A. Stop warfarin and replace it with SC heparin for 48 hours till INR is below 1.4 and then proceed with surgery.
- B. Proceed immediately with surgery without stopping warfarin.
- C. Stop warfarin, give fresh frozen plasma (FFP) and proceed to surgery.

D. Stop warfarin and proceed with surgery in 24-48 hours.

A. In this case, warfarin should be stopped and subcutaneous heparin should be given till the INR reaches below 1.4, then surgery could be initiated. Subcutaneous heparin is continued for one week. Warfarin should be restarted after the drain is removed, and is continued together with SC heparin till INR reaches the therapeutic level again i.e. 2-3.

10. What is the percentage of people who are Rh -ve?

- A. 10%.
- B. 20%.
- C. 25%.
- D. 15%.

D. The percentage of population who are Rh -ve are about 15% of the total population. They should receive only Rh -ve blood transfusions. Administration of Rh +ve blood could be given to men if Rh -ve blood is not available in an emergency situation, but this should be avoided in females during the childbearing period.

Choose the single best answer

1. One of the following is an anaerobic organism:

- A. *Staphylococcus aureus*.
- B. *E. coli*.
- C. *Klebsiella*.
- D. *Pseudomonas aeruginosa*.
- E. *Bacteroides*.

E. Bacteroides are the commonest anaerobic organisms that are met in surgical practice. Anaerobes are sensitive to metronidazole and to clindamycin.

2. The organism that produces green pus is:

- A. *Bacteroides fragilis*.
- B. Beta haemolytic streptococci.
- C. *Pseudomonas aeruginosa*.
- D. *Salmonella*.
- E. *Staphylococcus aureus*.

C. P. aeruginosa is an aerobic Gram negative bacillus. It is a common cause of nosocomial infections as urinary tract infection, pneumonia and septicaemia. It is characterized by the production of green pus.

3. One of the following is an anaerobic organism:

- A. *E. coli*.
- B. *Clostridium perfringens*.
- C. *Staphylococcus aureus*.
- D. *Pseudomonas aeruginosa*.
- E. *Salmonella typhi*.

B. Clostridium perfringens was previously known as *Clostridium welchii*. It is the main organism that causes clostridial gas gangrene.

4. Organisms found in the colon are mostly:

- A. Gram positive cocci and anaerobes.
- B. Gram negative cocci and anaerobes.
- C. Gram negative bacilli and anaerobes.
- D. Gram positive bacilli and anaerobes.
- E. Gram negative cocci only.

C. Colonic bacteria are a mixture of Gram negative bacilli and anaerobes.

5. The main source of staphylococci in the body is:

- A. The urinary tract.

- B. The stomach, duodenum, and upper jejunum.
- C. The colon.
- D. The nasal cavity and skin.
- E. None of the above.

D. Nasal carriers of *Staph aureus* play a major role in the causation of hospital-acquired infections. Eradication of the carrier state among hospital personnel is likely to reduce the incidence of such infections.

6. To prevent foot infection in a diabetic patient the following recommendations are all correct except

- A. Careful trimming of toe nails.
- B. Monthly injection of the long-acting benzathene penicillin.
- C. Regular washing and daily inspection of the feet by the patient.
- D. Early treatment of tinea pedis infection.
- E. Avoidance of walking bare-footed.

B. Antibiotics have no role in prophylaxis against diabetic foot infections.

7. The usual treatment of diabetic foot infection includes the following except:

- A. Urgent arteriography
- B. Antibiotics
- C. Control of diabetes mellitus
- D. Wide incisions to drain pus
- E. Debridement of dead tissues

A. Arteriography is indicated only if there is critical limb ischaemia.

8. Find the incorrect statement about prophylactic antibiotics against postoperative wound infection:

- A. They are indicated for contaminated operations.
- B. They are indicated when a prosthetic implant is inserted.
- C. They are started one hour before the operation or with induction of anaesthesia.
- D. They reduce the possibility of wound infection in contaminated operations.
- E. Antibiotic administration should be continued for five days after the operation.

E. Prophylactic antibiotic administration reduces the incidence of surgical site infection (SSI). Usually it needs not exceed the operation period. It is extended only if there is gross contamination. There is no evidence for the effectiveness of extending prophylactic antibiotics more than one day after the operation.

9. What is the most effective timing of a specific antibiotic during preparation of the patient for elective colectomy?

- A. A single preoperative dose and 24 hrs postoperative dose.

- B. A single preoperative dose and 48 hrs postoperative dose.
- C. A single dose given within 30 min prior to skin incision.
- D. A single dose at the time of skin incision.

C. Antibiotic prophylaxis by definition means that the administration of antibiotic before the surgical procedure. The best timing is 30-120 minutes before the incision. Administration of an additional dose of antibiotic during the surgical procedure is required if it is prolonged. This ensures adequate tissue levels throughout the procedure.

10. The main line of treatment of an acute pyogenic abscess of the thigh is:
- A. Repeated aspiration with a needle and local antibiotic injections.
 - B. Parenteral antibiotics against Gram-negative bacilli.
 - C. Repeated I.V. injections of high doses of metronidazole.
 - D. Incision and drainage of the abscess.
 - E. None of the above.

D. The golden rule for the treatment of an abscess anywhere in the body is drainage of pus. For a pyogenic abscess, the usual method of drainage is by incision. The operation is, therefore, called incision and drainage.

For some abscesses drainage is by aspiration:

- Brain abscess; because one should not cut through its tissues in order to reach the cavity.
- Intra-abdominal abscesses can be aspirated under image control (ultrasound or CT). A fine catheter can be inserted to ensure continuation of drainage.
- A tuberculous abscess (cold abscess) is drained by repeated aspiration. Anti-tuberculous treatment should be administered.
- Amoebic abscess of the liver. Metronidazole should also be given.

11. About postoperative wound infection, one statement only is true:

- A. Is more frequent in thyroidectomy than with colectomy.
- B. Antibiotics have no effect in its prevention.
- C. Usually presents in the first postoperative day.
- D. Main line of treatment is by broad-spectrum antibiotics.
- E. Is usually followed by secondary intention healing.

E. Such infections are greatly reduced if prophylactic antibiotics are used in contaminated operations such as colectomies. First line treatment is pus drainage by removal of sutures.

12. What is the antibiotic of choice in penicillin-allergic patients undergoing emergency cholecystectomy for acute cholecystitis?

- A. Vancomycin + metronidazole.
- B. Quinolone + metronidazole.
- C. Quinolone only.
- D. None of the above.

A. Metronidazole covers anaerobic bacteria. For aerobes the first generation cephalosporin, cefazolin (kefzol, Ancef), is the one that is in common use for surgical prophylaxis. Because of cross allergy between penicillin and cephalosporins, the latter is replaced with a quinolone. Therefore, a quinolone and metronidazole combination is the best choice for penicillin-allergic patients undergoing biliary surgery in presence of contamination.

13. What is the best choice of antibiotic prophylaxis in the patients undergoing cardiovascular surgery?

- A. Cefazolin.
- B. Vancomycin.
- C. Clindamycin.
- D. None of the above.

A. Cefazolin is the best prophylaxis in patients who are undergoing cardiovascular surgery. If the patient is allergic to penicillin, then vancomycin is the antibiotic of choice. Cefazolin is a cephalosporin and there is cross allergy with penicillin as well.

14. What is the most appropriate antibiotic prophylaxis in patients who are undergoing elective gastroduodenal operations?

- A. Cefazolin.
- B. Fluoroquinolone.
- C. Ampicillin-sulbactam.
- D. Clindamycin.

A. Cefazolin is the antibiotic of choice; but in penicillin-allergic patients, fluoroquinolone is the antibiotic of choice.

15. What are the prophylactic antibiotics of choice in colorectal surgery?

- A. Cefazolin and metronidazole.
- B. Fluoroquinolone with metronidazole.
- C. Vancomycin.
- D. Ampicillin-sulbactam.

A. Cefazolin and metronidazole, for anaerobic organisms, is the best combination; but if the patient is allergic to penicillin, then fluoroquinolone with metronidazole or clindamycin is best combination.

16. What is the prophylactic antibiotic of choice in neurosurgery?

- A. Cefazolin.
- B. Gentamicin and clindamycin combination.
- C. Vancomycin.
- D. None of the above.

A. Cefazolin is the best antibiotic of choice; but if the patient is allergic to penicillin, then vancomycin is a good alternative.

17. What is the prophylactic antibiotic of choice in orthopaedic surgery?
- Cefazolin.
 - Vancomycin.
 - Clindamycin.
 - Ampicillin-sulbactam.

A. Cefazolin is the antibiotic of choice provided there is no allergy to penicillin. If patient is allergic to penicillin, then vancomycin is antibiotic of choice.

18. What is the approximate duration of antibiotic treatment in peritonitis following a perforated appendicitis?
- 7-10 days.
 - 3-6 days.
 - 14-21 days.
 - More than 21 days.

B. In this example antibiotics are used for treatment. That is why the duration of its administration is longer than that for prophylaxis. In this case, 3-6 days of therapy is satisfactory.

19. What is the appropriate duration of antibiotic therapy in generalized peritonitis with an extensive soiling following perforated descending colon (fecal peritonitis)?
- 7-10 days.
 - 3-5 days.
 - 10-15 days.
 - More than 21 days.

C. Fecal peritonitis is the worst type. About 10-15 days of antibiotic treatment are needed. Usually fever and white cell count return to normal levels by this time. These are the criteria of resolution of infection.

20. Which one of the below is not a risk for surgical site infection (SSI)?

- Recent surgery.
- Infancy.
- Prolonged hospitalization.
- Surgery after radiation.

B. Infancy is not a risk factor for developing SSI, but the real risks for development of SSI are: Old age, immunocompromised patients, diabetes mellitus, hypoalbuminaemia and malnutrition, anaemia, radiation, and chronic staph infection.

Other factors include prolonged hospitalization, poor skin preparation, poorly sterilized instruments, lengthy procedures, hypoxia, local site infection or necrosis.

21. What is the expected rate of infection in class I clean operation?

- 1-5%.

- B. 3-9%.
- C. 3.5-13%.
- D. None of the above.

A. Clean class I surgical procedure such as hernia repair or breast biopsy have an expected infection rate of 1-5%.

Wounds are divided into the following classes:

- Clean class I such as LN biopsy, breast biopsy, and hernia repair (expected infection rate 1-5%).
- Clean/contaminated class IIa such as elective gastroduodenal surgery and cholecystectomy (expected infection rate 2-9%).
- Clean/contaminated class IIb such as colorectal surgery (expected infection rate is 8 to 25%).
- Contaminated (class III) enterectomy during bowel obstruction, penetrating abdominal trauma (expected infection rate 15-30%).
- Dirty (class IV) perforated colon (diverticulitis) where expected infection rate is above 40%.

22. What is the most common cause of hepatic abscess in the Western Countries?

- A. Infection with *entamoeba histolytica*.
- B. Biliary tract procedure.
- C. Septicaemia.
- D. Neglected diverticulitis.

B. This is a rare condition accounting for 10 out of 100,000 people in the western countries. About 80 are pyogenic following biliary tract procedure. In the rest of the world, about 50% of the liver abscess cases are either parasitic or fungal in origin.

23. What is the most important factor that contributes to reduction of the incidence of pancreatic abscess in patients with acute necrotizing pancreatitis?

- A. Enteral nutrition.
- B. Prophylactic antibiotics.
- C. Imaging and percutaneous sampling of any fluid collection.
- D. Parenteral nutrition.

A. Enteral feeding with a nasojejunal tube placed past Treitz ligament has been associated with decreased incidence of infected pancreatic necrosis and abscess formation. This is probably due to decrease in translocation of gut bacteria. Antibiotics are also effective for this purpose, but enteral feeding is more preventive.

24. Against which one of the following infections surgeons and nurses should be immunized?

- A. Hepatitis A.
- B. Hepatitis C.
- C. Hepatitis B.

D. HIV virus.

C. Every surgeon and nurse should receive immunization against Hepatitis B (HBV), and antibody titer should be checked and a booster dose of immunization should be given if the antibody titer is low. Chronic HBV carriers are liable for liver failure or hepatocellular carcinoma in about 30%.

25. All the following statements about erysipelas are true, except:

- A. Usually caused by methicillin resistant Staph. aureus (MRSA).
- B. Sensitive to penicillin.
- C. Infectious.
- D. Spreading infection with no pus formation.
- E. Rose pink skin patches with vesicles at the edge.

A. The causative organisms are Streptococci.

26. In tetanus infection the following statements are correct except:

- A. The manifestations are caused by the toxin of Clostridium tetani.
- B. The toxin travels along nerves to the central nervous system.
- C. The spasm can stop respiration.
- D. It may affect the neonate.
- E. The specific antibiotic is gentamycin.

E. Penicillin and metronidazole are the specific antibiotics against Clostridium tetani.

27. About gas gangrene, one of the following statements is wrong

- A. Infection is caused by Clostridia.
- B. Lacerated deep wounds, foreign bodies, and ischaemia are predisposing factors.
- C. Bradycardia is diagnostic.
- D. Crepitus may be elicited.
- E. Treatment includes wound debridement and drainage, hyperbaric oxygen, and IV penicillin.

C. These patients have tachycardia. Crepitus is caused by gas production.

28. About cellulitis, one statement only is correct:

- A. Treatment is essentially incision and drainage of pus.
- B. Infection is usually caused by Streptococci.
- C. Histologically the presence of giant cells is diagnostic.
- D. The antibiotic of choice is metronidazole.
- E. Cellulitis is infection of the dermal lymphatics.

B. Cellulitis is diffuse inflammation of the connective tissues that is caused by Streptococci. There is no pus formation. Penicillins are the specific antibiotics. Metronidazole is of no use here as it is effective only against anaerobes.

When Streptococci infect dermal lymphatics they cause erysipelas.

Choose the single best answer

1. What is the percentage of water in a healthy adult?

- A. 30 – 40% of body weight.
- B. 45 – 65% of body weight.
- C. 70 – 80% of body weight.
- D. 15 – 20%.

B. In a young adult male, water constitutes about 60 – 65% of total body weight; and in a young adult female, it is about 45 – 50%. This is due to the higher percentage of adipose tissue and lower muscle mass.

2. Which one of the following has maximum amount of water in the body?

- A. Intracellular fluid.
- B. Interstitial fluid.
- C. Plasma.
- D. Central spinal fluid.

A. Intracellular fluid is the largest fluid compartment containing 40% of body weight, next is the extracellular compartment (plasma and interstitial fluid) accounting for about 20% of body weight. The central spinal fluid is a very small compartment which is composed mainly of plasma.

3. Which one of the following is the predominant cation in intracellular fluid?

- A. Chloride.
- B. Calcium.
- C. Sodium.
- D. Potassium.

D. Potassium is most abundant cation in intracellular fluid (ICF). Calcium is present in very small amounts, while chloride is an anion.

4. Which is the predominant cation in the extracellular fluid?

- A. Sodium.
- B. Magnesium.
- C. Calcium.
- D. Potassium.

A. Sodium is the most abundant cation in the extracellular fluid (ECF).

5. Which one of the below presents with decreased deep tendon reflexes?

- A. Hypomagnesaemia.
- B. Hypocalcaemia.
- C. Hyponatraemia.
- D. Hypokalaemia.

D. Hypokalaemia causes decreased deep tendon reflexes; and on the contrary, hypocalcaemia and hypomagnesaemia causes increased deep tendon reflexes.

6. What are the ECG changes expected to be seen in patients with hyperkalaemia?
- Prolonged PR interval.
 - Atrial fibrillation.
 - Peaked T waves.
 - Inverted T wave.

C. Peaked T wave is the first ECG change seen in patients with hyperkalaemia, although other ECG changes could also be seen.

7. Hypomagnesaemia resembles the clinical picture of which one of the following?
- Hypokalaemia.
 - Hyperphosphataemia.
 - Hyperglycaemia.
 - Hypocalcaemia.

D. Hypomagnesaemia is not uncommon. It may be seen in ICU patients who receive total parenteral nutrition without adequate supplementations and those on diuretics. It causes tremors, hyperactive reflexes, tetany and positive Chvostek's sign.

8. What is the treatment of choice for a patient who has potassium level of 6.5 mmol/L and ECG changes of hyperkalaemia?

- Calcium gluconate.
- Lactated Ringer.
- Insulin and glucose.
- Kayexalate (cation exchange resin).

C. The aim of the treatment is to shift potassium from extracellular space to the intracellular one. Cation exchange resin can also be used orally and rectally. These resins bind potassium in exchange of sodium. Bicarbonate in glucose may also be used.

9. What is the basal daily required amount of water for adults?
- 10 ml/kg.
 - 15 ml/kg.
 - 35 ml/kg.
 - 55 ml/kg.
 - 75 ml/kg.

C. The basal requirement of water in adults is 35 ml/kg/day.

10. Regarding hypokalaemia, all the following statements are true, except:

- Serum potassium of 2.5 mmol/L is Hypokalaemia

- B. Hypokalaemia causes acidosis.
- C. Severe diarrhoea may cause Hypokalaemia.
- D. Hypokalaemia causes muscle weakness.
- E. Hypokalaemia causes paralytic ileus.

B. The normal serum potassium is 3.5 to 5 mmol/L. When serum potassium level drops, potassium ions (K^+) move out of cells to the extracellular space in an attempt to normalize its serum level. This occurs in exchange for another positively charged ion, which is hydrogen (H^+). The latter moves from the extra- to the intra-cellular compartment. The resulting reduction of H^+ in the extracellular fluid causes alkalosis.

11. About metabolic acidosis, one statement only is true:

- A. It is caused by pyloric stenosis.
- B. It causes hyperkalaemia.
- C. Arterial bicarbonate level is elevated.
- D. pH is above 7.4.
- E. Respiratory rate is reduced.

B. Pyloric stenosis causes loss of hydrochloric acid. This results in metabolic alkalosis. Hydrogen ion goes in the cells in exchange for potassium that goes out, causing hyperkalaemia. Arterial bicarbonate level is reduced. Acidosis means pH below 7. The patient hyperventilates to wash out carbon dioxide.

Choose the single best answer

1. Local anaesthetics exert their effect on:
- Potassium channel.
 - Sodium channel.
 - Calcium channel.
 - Magnesium channel.

Local anaesthetics block nerve conduction by acting on the sodium channels. They inhibit the action potential, thus prevent propagation along the target nerve.

2. Which of the following drugs produces amnesia and analgesia?
- Propofol.
 - Ketamine.
 - Thiopental.
 - All of the above.

Ketamine produces analgesia and amnesia and differs from the other as its action is on methylglutamate receptors. Other drugs exert their action on the alpha aminobutyric acid receptors.

3. Neuromuscular blockade is reversed by:
- Acetylcholine increase.
 - Breakdown of the neuromuscular agent.
 - Drug antagonist.
 - All of the above.

The use of anticholinesterase agents reduces the breakdown of acetylcholine, thus increasing its level above the neuromuscular blocking agents.

4. As a local anaesthetic, the maximum safe dose of lidocaine is:
- 5mg/kg.
 - 10mg/kg.
 - 15mg/kg.
 - 20mg/kg.
 - 25mg/kg.

The maximum safe dose of lidocaine is 5mg/kg body weight. This can be safely raised to 7mg/kg if it is combined with adrenaline. The latter causes vasoconstriction and slows down the drug absorption into the circulation.

5. All of the following nerves are blocked by epidural anaesthesia except:
- Parasympathetic.
 - Motor.
 - Sensory.

D. Sympathetic.

A. In spinal and epidural anaesthesia, the patient achieves analgesia due to sensory block, muscle relaxation from blockage of the motor nerve, and reduction of blood pressure due to sympathetic nerve blockade. These three kinds of nerves are blocked as they exit from the spinal cord. There is no effect on the parasympathetic nervous system.

6. Postspinal anaesthetic headache is usually due to:

- A. Using large bore needle.
- B. Slow injection.
- C. Increase narcotics.
- D. All of the above.

A. A big needle causes prolonged leakage of CSF. Using a small-calibre spinal needle reduces CSF leak and, consequently, reduces headache.

7. Which of the following opioid analgesic has respiratory depression effect?

- A. Sufentanil.
- B. Remifentanil.
- C. Fentanyl.
- D. All of the above.

D. All opioid analgesics can cause respiratory depression.

8. Malignant hyperthermia can be triggered by:

- A. Sevoflurane.
- B. Ketamine.
- C. Propofol.
- D. None of the above.

A. All volatile anaesthetics as halothane and sevoflurane can trigger malignant hyperthermia.

9. Inhalation anaesthesia induces:

- A. Airway dilatation.
- B. Airway constriction.
- C. Decrease sputum production.
- D. None of the above.

A. Inhalation anaesthesia has a bronchodilator effect.

10. Which of the following is the preferred technique for general anaesthesia induction that is most commonly used in adults?

- A. Intravenous induction.
- B. Inhalation induction.

- C. Rapid sequence induction.
- D. All of the above.

A. For adults, the best method is the intravenous technique using a rapid induction agent after proper pre-oxygenation and followed by mask ventilation and neuromuscular blockade and then endotracheal intubation.

11. Preload is defined as:

- A. End diastolic pressure.
- B. End systolic pressure.
- C. End diastolic volume.
- D. End systolic volume.

C. Preload is determined by the end-diastolic volume (EDV).

12. For intubated patients in the ICU, which of the following is an indication for extubation?

- A. Good muscle power.
- B. Obey command.
- C. Satisfactory blood gas analysis data.
- D. All of the above

D. The patient must be fully alert, with good muscle power and satisfactory blood gas analysis parameters.